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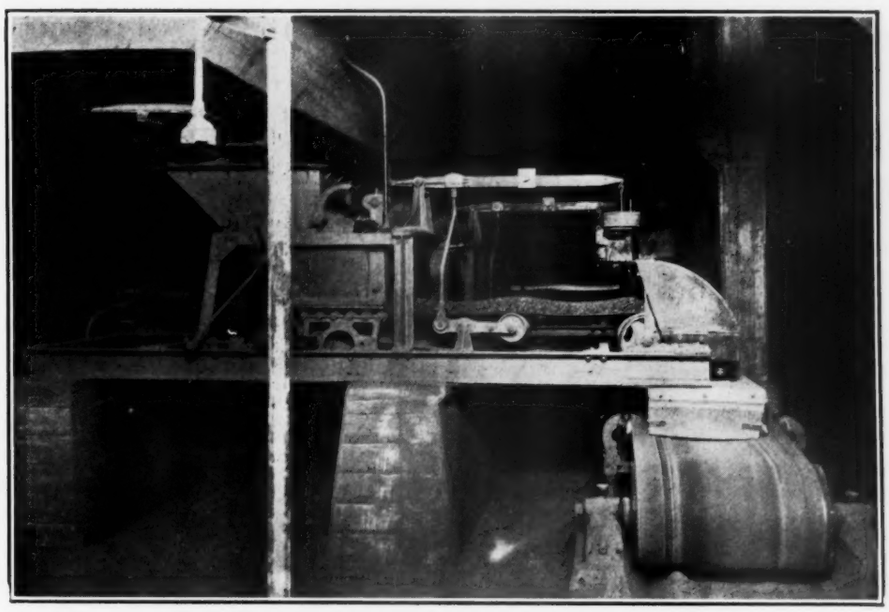
Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, November 22, 1930 | Issued Every Other Week | Volume XXXIII, No. 24

Accurate Proportioning at Minimum Expense

High Quality Cement requires accurate mixture of both raw and finish materials, and as Schaffer Poidometers feed material by **WEIGHT** and **NOT VOLUME** with a high degree of accuracy, it will be to your advantage to investigate the Automatic Feeder, Weigher and Conveyor.



Three Schaffer Poidometers proportioning Clinker and Gypsum at the Davenport, California, plant of the Santa Cruz Portland Cement Company

Cement Mills Are Using Over 200 Schaffer Poidometers

They find them a most economical means of providing the more accurate proportioning made necessary by the new standards of cement manufacture. Poidometers assist in improving the quality of cement without adding to its manufacturing costs.

The following are among those who recently purchased Poidometers:

Universal Atlas Cement Co., Chicago, Ill., 5 Poidometers. LaTolteca Portland Cement Co., Mexico, 4 Poidometers.
Vulcanite Portland Cement Co., Phillipsburg, N. J., 2 Poidometers. Marquette Cement Mfg. Co., Chicago, Ill., 2 Poidometers.
Allentown Portland Cement Co., Catasauqua, Pa., 5 Poidometers. Missouri Portland Cement Co., St. Louis, Mo., 4 Poidometers.
Canada Cement Company, Montreal, Canada, 2 Poidometers.

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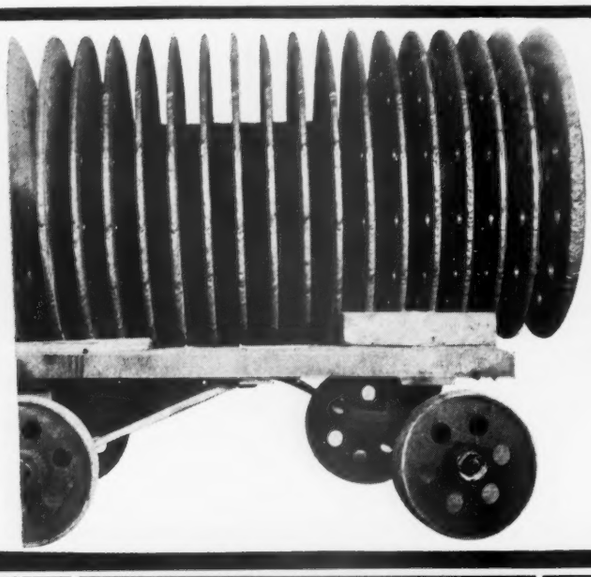
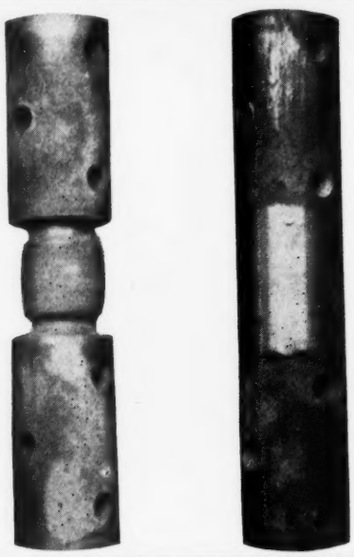
Wherever METAL WEARS- STOODY ALLOY WELDING RODS Will Save You Money



The battery of hammermill rotors shown at the left were overlayed with STOODITE on May 1, 1929, and after thirteen months of continuous duty show no evidence of wear. Unoverlayed rotors in the same service were worn out, necessitating replacement in from twelve to eighteen months of service.

At the right is an illustration of the use of STOODITE overlays on conveyor gudgeons. The overlayed gudgeon gives from four to six times the length of service of the unoverlayed gudgeon and, due to the peculiar consistency of STOODITE overlays, the overlayed gudgeon performs much better in service.



STOODITE is one of the several STOODY ALLOY WELDING RODS, each designed for a specific purpose, that are revolutionizing industry.

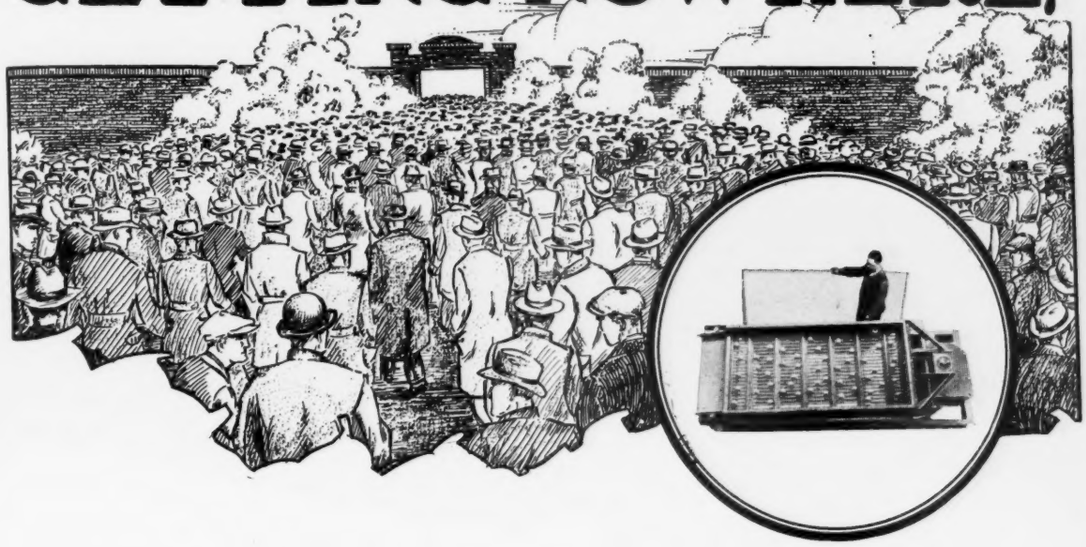
STOODY COMPANY

Manufacturers of

Welding Rod ◆ Alloy Steels ◆ Equipment

WHITTIER, CALIFORNIA

A RUSH CROWD GETTING NOWHERE!



ROTEX SCREENS

AT the ringside, the ball game, or any event, the hurried mob becomes jammed to a standstill because of inadequate means of letting them pass. In screening, the material, like humans, crowds together and clogs the exits—(screen openings)—retarding the flow of material. All the while the clock ticks away the seconds, the minutes and hours, while salaries go on and power costs rise.

ROTEX SCREENS with their rubber ball mesh cleaning system and nearly level circular motion, assure clean screens with every inch working to capacity in sizing one inch material and finer with absolute accuracy.

Our engineers will be pleased to co-operate with you in solving your screening problem most efficiently and economically.

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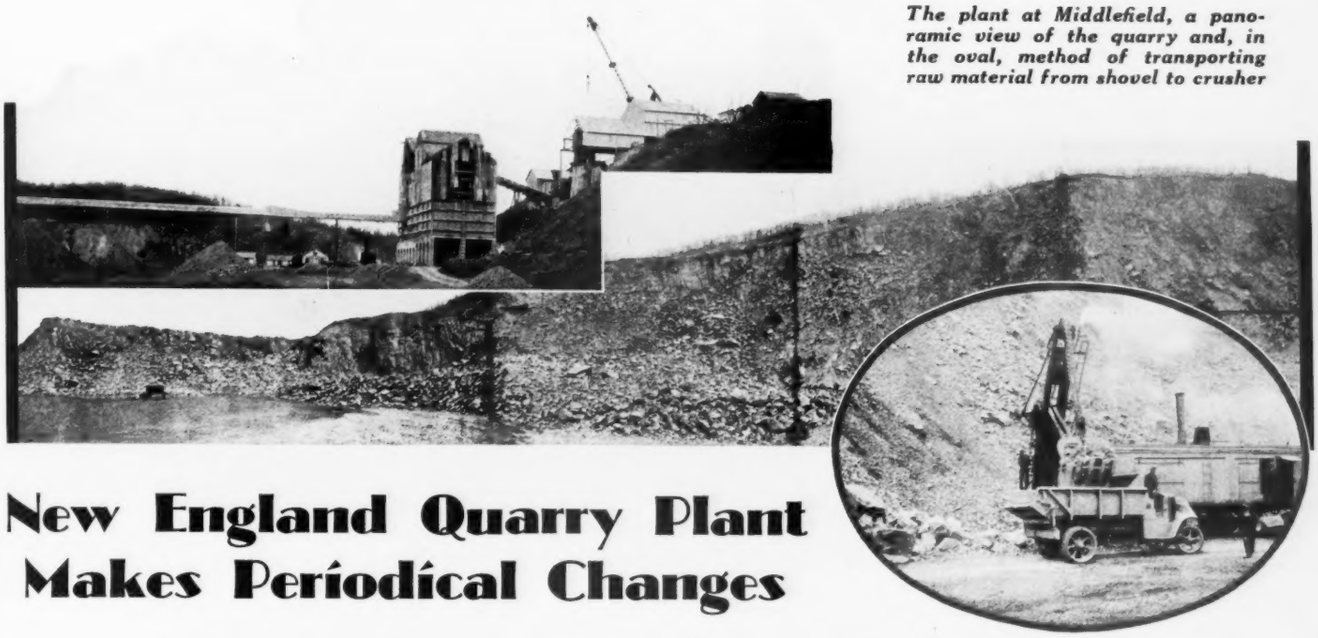


The plant at Middlefield, a panoramic view of the quarry and, in the oval, method of transporting raw material from shovel to crusher

New England Quarry Plant Makes Periodical Changes

Connecticut Quarries Co., Middlefield, Conn., Plant Changes from Steam to Electric Power; From 100% Rotary Screening Operation to Practically 100% Vibrating Screen Operation

AT THE MIDDLEFIELD, CONN., OPERATIONS of the Connecticut Quarries Co., Inc., near Meriden, Conn., recent changes and improvements have been of such a scope as to mean practically the rebuilding of the entire plant and installing all new equipment with the exception of the scalper screens and a few miscellaneous items. The structure housing the new screening units with its wooden bins remains practically intact, but all of the old rotary screen equipment has been removed and vibrating screens installed in their stead.

The plant was visited by one of the editorial staff at the time the new equipment was being adjusted for its preliminary run. A second visit was made after the plant had operated for most of the 1930 season to determine what advantages (or disadvantages) had developed by changing from a 100% rotary screen practice to almost a 100% vibrating screen practice.

Screening methods were not the only changes made for the plant was completely electrified. Where convenient, direct-connected and Texrope drives were installed, with the main crushers and scalping screens driven from a new 500-hp. synchronous motor. This installation is somewhat unique and the idea of driving crushers from the extended shaft of the synchronous motor (which acts as a line shaft) was not at first viewed with optimism, but the engineers of the Westinghouse company tackled the job and it has resulted in an installation that has made material monthly power savings due to the high and uniform power factor. The management is well satisfied with the results of this unusual installation.

Plant office at Middlefield

The vibrating screens have worked out successfully on all the sizes although some slivers and elongated pieces pass the screens of larger mesh. This condition is not at all serious, however. The vibrating screens have also proven very economical to operate when compared to the rotary screens as regards power and general maintenance, although the wear on the screen cloth is greater than with the rotary screens. The tonnage of the plant has fulfilled expectations.

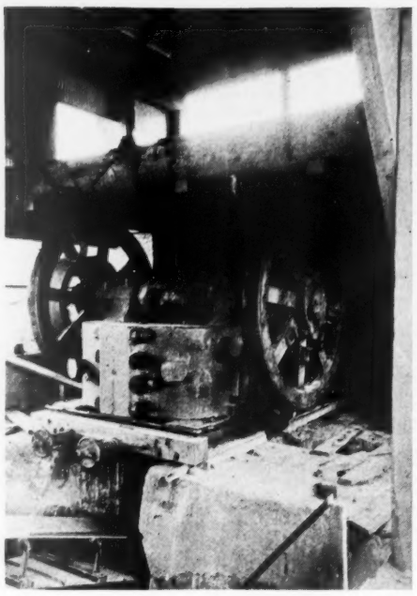
Likewise the new primary crusher came up to expectations as did the cone secondary crusher. It was said that the new secondary crusher resulted in a material reduction in the amount of minus ¼-in.

Trucks and bodies being used at Middlefield

material produced although the exact percentage was not determinable.

Rebuilding Program

The crushing plant was entirely rebuilt and a new 48-in. by 60-in. Farrel-Bacon jaw crusher installed as the primary breaker. This crusher has corrugated jaw and breaker plates of manganese steel to withstand the wear and tear incidental to the crushing of a tough, hard, trap rock. A part of the 1¾-in. manganese steel hopper that was a part of the older plant was remodeled so that the 8-yd. Mack trucks that are used in the quarry could discharge direct to the crusher. The company has three of these trucks, all equipped with Easton, rear-dump bodies, and using solid rubber tires. The Lidgerwood hoist with the Terry stiff-leg crane that served the earlier primary crushing unit is still used along with a Yale and Towne chain block and hoist from which



The jaw crusher handles a tough and hard trap rock, discharging direct to a 48-in. belt conveyor

is suspended an air hoist. This is mounted directly over the primary crusher.

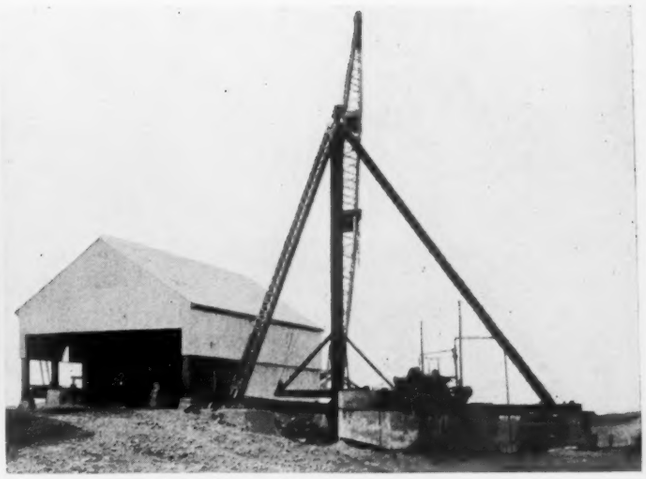
The jaw crusher is set to deliver a 6-in. product, which falls to a 48-in. belt conveyor using Robins, Alemite lubricated carrier and return rolls, and a 6-ply Goodyear belt. The belt is inclined at an angle of 19 deg., with its carrier rolls spaced on 4-ft. centers and of the three-roll type.

The material falls direct to this belt from the primary crusher and is delivered to a new 7-ft. Symons cone crusher that reduces the 6-in. feed product to 2½ in. at the rate of 800 tons per hour. The primary crusher has a capacity of 500 to 600 tons per hour at the ratios of reduction indicated.

The cone crusher discharges to two

The entire plant of the Connecticut Quarries Co., Inc., at Middlefield, Conn., has been practically rebuilt

quarry, also views showing one dumping to the primary crusher



The jaw crusher building

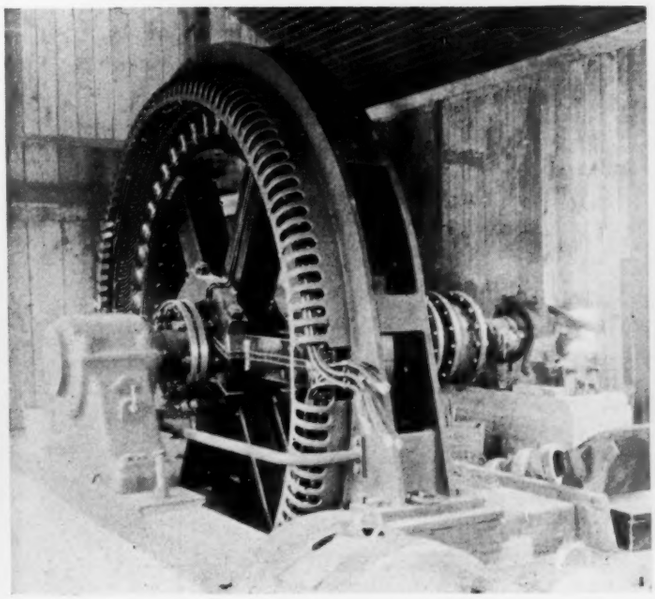
5-ft. by 16-ft. rotary scalpers, one of which has manganese-steel plates with 3-in. square perforations, while the other uses wire cloth giving the same size product as the first mentioned screen. The oversize from the scalpers is elevated back to the cone crusher by a 24-in. bucket elevator, with the fines falling to a 36-in. belt conveyor that delivers the crushed trap rock to the screening plant. The primary and secondary crusher and the two scalpers are all driven by a new 500-hp. 440-v. 3-ph. 60-cyc. Westinghouse synchronous motor, direct-connected to a line shaft from which the crushing and screening units are belted. This line shaft was part of the old steam-engine-driven plant, until these changes were made.

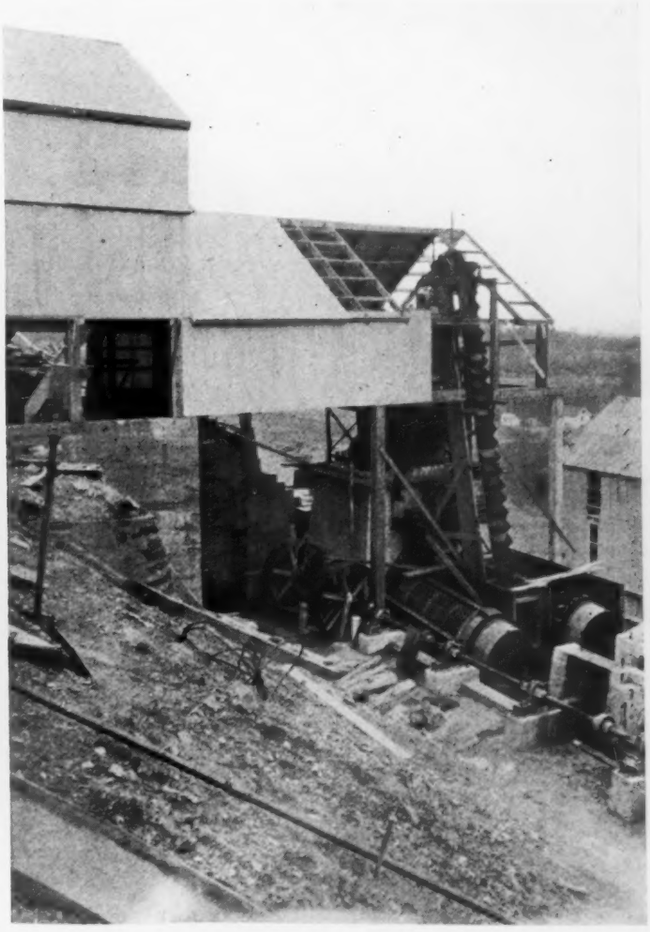
In the new plant all of the various items of equipment are now driven, with the exception of the crushers and scalpers, by separate induction motors. The bucket elevator is driven by a 15-hp. Fairbanks-Morse, "Line-Start" induction motor; the 48-in. belt conveyor by a 20-hp. motor and the 36-in. belt by a 30-hp. motor of the same make as the 15-hp. unit. The three items are all driven through open gear reduction units.

Screening Plant

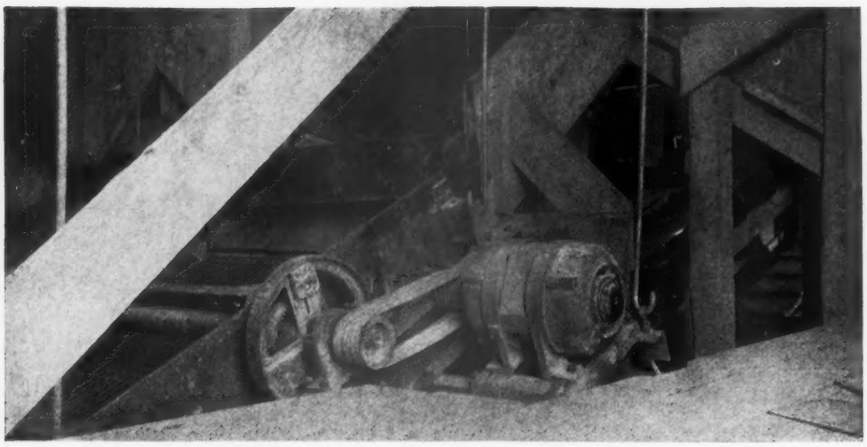
The screening plant is equipped throughout with Niagara vibrating screens. The crushed rock from the 36-in., off-bearing belt conveyor of the cone crusher splits and falls to two single-decked 6-ft. by 8-ft. vibrating screens having 1½-in. openings. The oversize from these screens can fall to bins, or to a single 6-ft. by 8-ft. one-decked screen that has a 1¼-in. wire cloth. Each of these screens and the platform on which rest the drive motors are suspended from five ¾-in. rods. They are each driven by 10-hp. Fairbanks-Morse, type "GLSC," induction motors through Texrope drives. The motors operate at 1200 r.p.m. All of the screens are driven in this manner.

The fines from the first set of screens fall to an inclined 24-in. belt conveyor and are delivered to a duplicate set of 6-ft. by 8-ft. screens having ¾-in. mesh, wire cloth. The oversize from these single-decked screens falls to bins and the





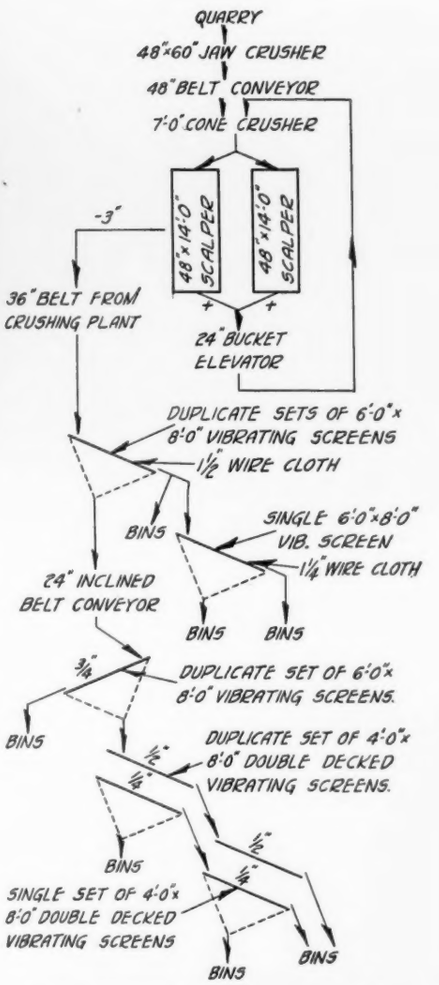
Above, new 500-hp. synchronous motor to drive main crushers, during course of construction. At right, cone crusher which discharges to the two scalpers



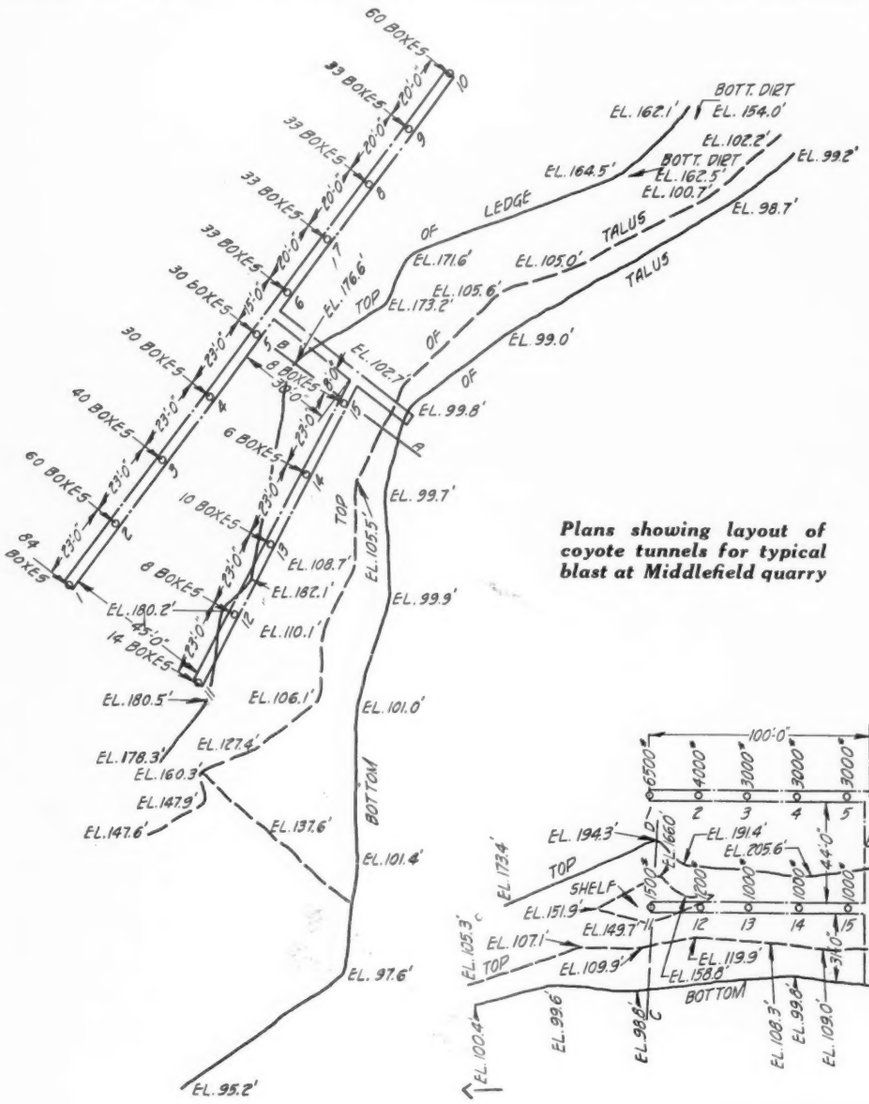
Drive motor and screen on initial set of vibrating screens

fines pass to a duplicate set of 4-ft. by 8-ft., double-decked Niagaras. The upper deck of these screens has ½-in. wire cloth and the lower ¼-in. The oversize from the upper decks converges and falls to a single set of 4-ft. by 8-ft. double-decked screens that also have screen cloth of the same mesh as the preceding screens. The oversize discharge from the lower deck (¼-in. to ½-in.) also converges and passes to the lower deck of this, the final screen, which acts as a cleaner. The various sizes of products that are produced all fall to 14 bins.

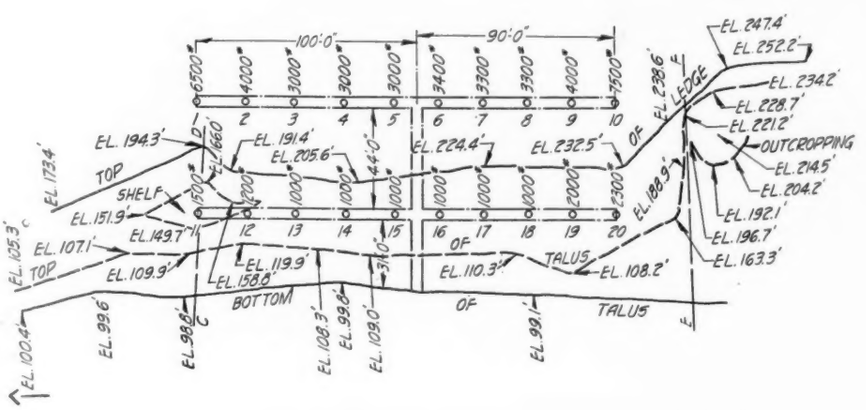
The bins can load direct to cars for shipment over the rails of the New York,



Flow sheet of the Connecticut Quarries Co. Inc., Middlefield plant



Plans showing layout of coyote tunnels for typical blast at Middlefield quarry



New Haven and Hartford R. R. or to 20-yd. Western cars that are used to haul the excess production to stock piles. The company has two American locomotives for this work and also a ¾-yd. Erie crane equipped with a Blaw-Knox clamshell for reclaiming. The yard equipment includes a pair of 120-ton capacity, Fairbanks-Morse, track scales.

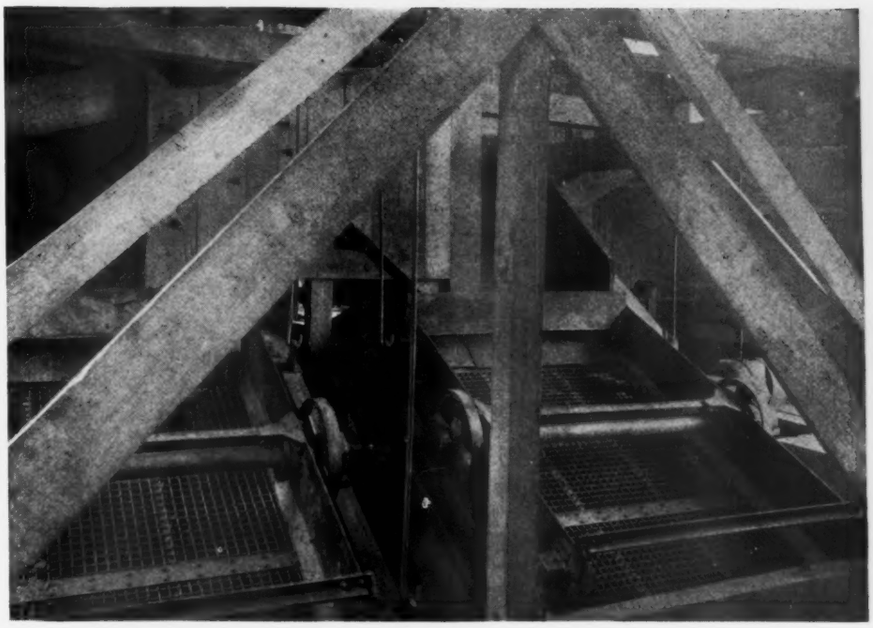
The minus ¼-in. material can be loaded to cars but the bulk of it falls to a horizontal 18-in. belt conveyor, running in a

gallery, to a pile where the fines are sluiced to waste. The fines, at present, do not find a ready sale in this district. An Amesite plant adjoins the plant, but is operated by a separate company.

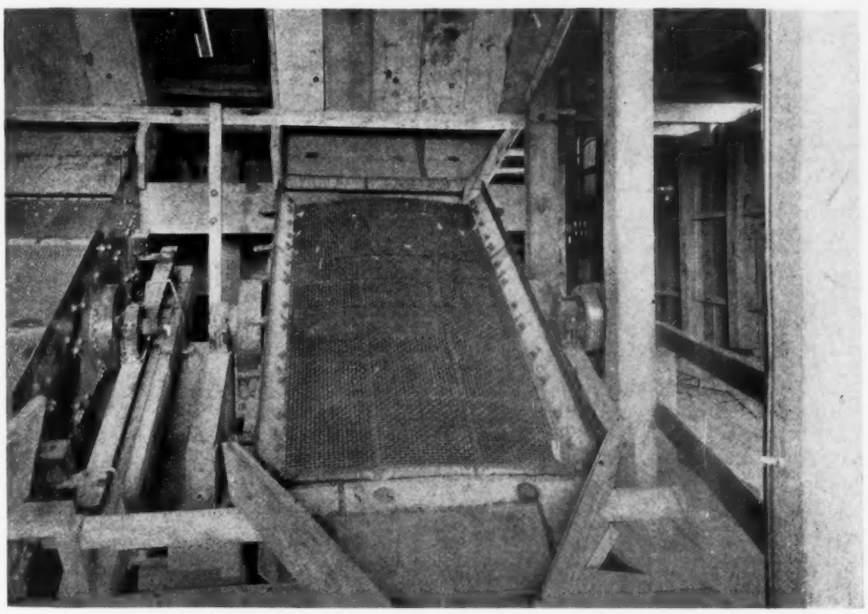
Electric Power Features

In the electrification of the plant, a six-mile line had to be run to the plant. The power is supplied by the Borough of Wallingford Electric Co. The electric current is stepped down from 23,000 v. to 220 v. in a 1000-kv.a., Westinghouse transformer that is provided with a B 26 Westinghouse oil circuit breaker.

The transformers and circuit breakers are located in one end of the building in which is also housed an Imperial, type XRE, Ingersoll-Rand compressor. The compressor has a 14-in. by 18-in. low cylinder and an 11-in. by 14-in. high pressure cylinder and is direct-connected to a 175-hp. General Electric synchronous motor that operates the compressor at 257 r.p.m.



Method of suspension for the primary set of vibrating screens

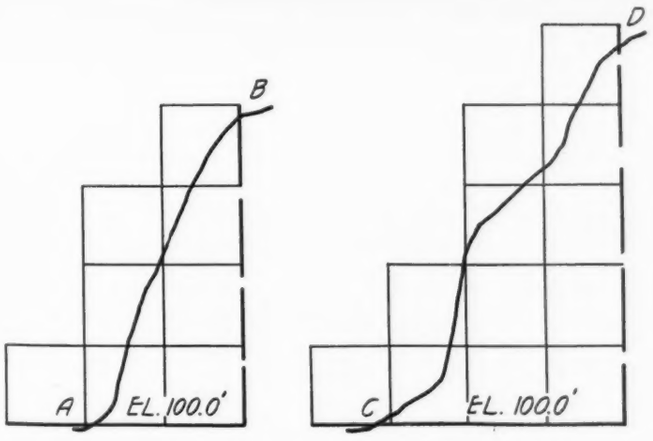


One of the 4- by 8-ft. vibrating screens

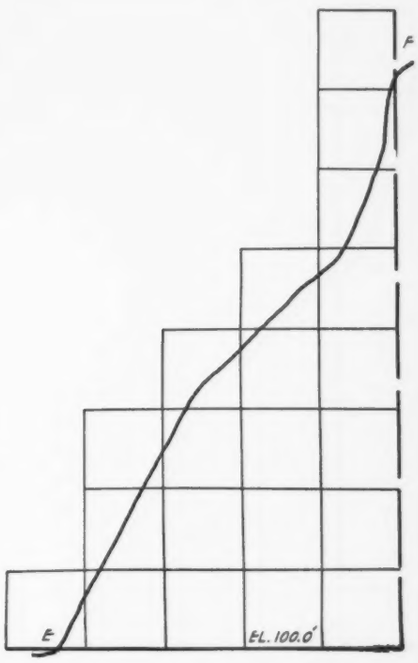
The Quarry

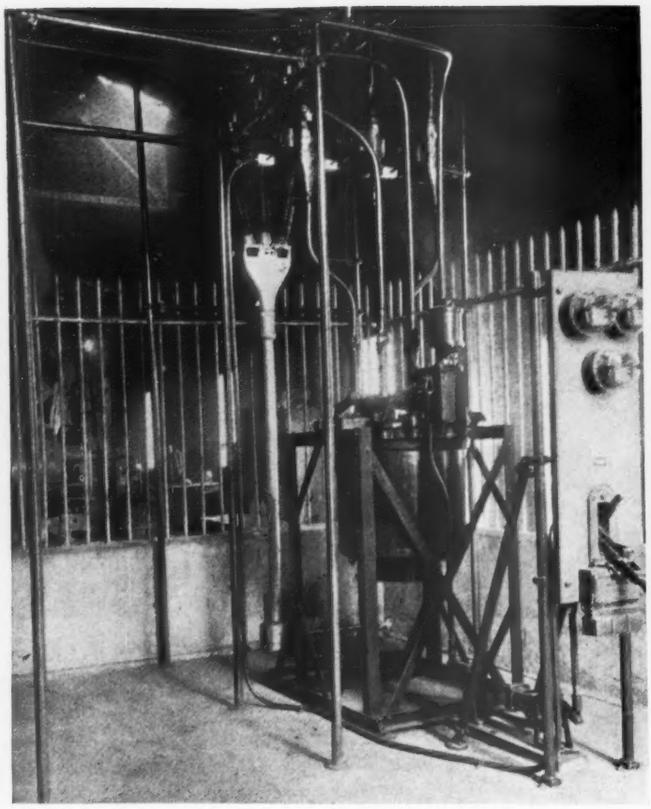
The face of the quarry at the Middlefield operation ranges from 80 to 190 ft. high, is approximately 1500 ft. long and is entirely free from overburden. The stone is loaded by a 2½-yd. Bucyrus and 2½-yd. Marion steam shovel mounted on traction wheels. These load to motor trucks that haul the stone an average distance of 500 ft.

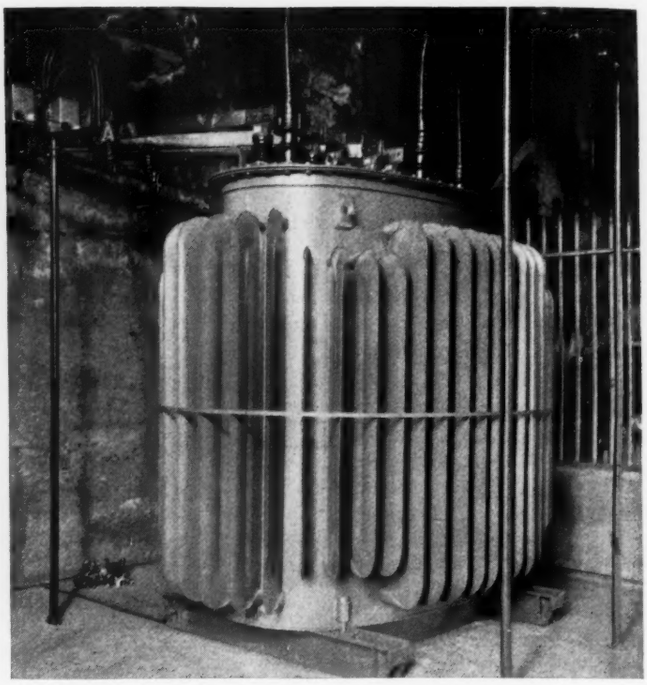
The coyote methods of shooting augmented by snake holes is practiced and has proven the most economical for this trap rock. In laying out the powder pockets a burden of 60 ft. is maximum as a greater shear burden leaves a hump in



Elevations of quarry face at indicated points in plans







The oil circuit breaker and transformers are located in the same building with the air compressor at the Middlefield plant

the quarry floor that has to be snakeholed and shot separately.

During April of this year, two coyote tunnels were shot; Tunnel No. 19 was loaded with 23,500 lb. of RCX, 40%, 5-in. by 16-in. du Pont dynamite and shot. No. 20 had a total load of 54,000 lb. of the same explosive.

Shot No. 20 had 41,000 lb. of powder in the back wings and 13,000 lb. in the front wings segregated in pockets as indicated on the accompanying sketch.

This charge was connected with four lines of electric exploders with No. 8 caps in each charge. Ordinarily the shots fired by this company are detonated by Cordeau but in this particular instance the shot was fired electrically for no particular reason other than an idiosyncracy of the powder man. It was estimated that 5 to 5½ tons of stone per pound of powder were secured, all of which was well shattered and required practically no secondary shooting.

Personnel

The offices of the Connecticut Quarries Co., Inc., are at 67 Church Street, New Haven, Conn. T. R. Blakeslee is president; A. L. Worthen, vice-president and general manager; H. L. Blakeslee, secretary; and Ray J. Reigeluth is treasurer.

F. H. Edwards is general superintendent of all eight of the company's plants and has his headquarters at Meriden, Conn. F. B. Kimball is superintendent of the Middlefield operation; John Michelin, plant foreman; Anthony Scarpa is quarry foreman and Geo. H. Jenkins, timekeeper.

Potash Extraction from Texas Polyhalite

FOLLOWING the earlier study as given in Report of Investigations No. 3002, the results of a further study on this subject are given by H. H. Storch in Report of Investigations No. 3032, October, 1930, by the U. S. Bureau of Mines. The previous study showed the behavior of polyhalite ($K_2SO_4 \cdot MgSO_4 \cdot 2CaSO_4 \cdot 2H_2O$) when calcined and leached with water. The present study gives data on the rate of decomposition of uncalcined polyhalite when treated with water at 25, 50 and 100 deg. C., and when treated with saturated NaCl solutions at 25 and 106 deg. C. Two samples of polyhalite were used, one containing 25.6% K_2SO_4 and the other 23.7% K_2SO_4. Different ratios of water to polyhalite were used from 1:1 to 6:1. At 25 deg. C., with the water treatment the highest concentration of potash was 5.07 grams of K_2SO_4 per 100 grams of water with equal parts of polyhalite and water, and at 504 hours' time. At 100 deg. C. the same concentration was obtained in 120 hours' time with two parts of water, which, however, is less than one-half that obtained in 45 minutes when calcined polyhalite is used, as shown by the previous study.

The reaction between saturated NaCl solutions and polyhalite was also studied to determine the possibility of producing KCl. Ratios of saturated NaCl to polyhalite of 2.4, 1.6, 0.80 and 0.92 were used. At 25 deg. C. the rate of decomposition was about the same as when the corresponding quantity of water was used.

At the boiling point, however, the rate of decomposition was much more rapid than with boiling water, namely, 73.8% decomposition with 2.4 parts of saturated NaCl solution in 24 hours, as against 37.4% with 2 parts of water. Practically complete extraction was obtained in 5 days by boiling with 2.4 parts of saturated NaCl solution, although it was possible to reach the maximum concentration of K_2O (7.75 grams per 100 grams of water) in 3 days with 1.6 parts of salt solution. So far as the rate of decomposition and per cent. of extraction are concerned, the experiments indicated that there was very little gained by using material finer than 65- to 100-mesh.

The maximum over-all yields in such extractions have not yet been determined, and treatment of the leach liquors for KCl and other potash salts require further investigation.

The results of this investigation showed that on account of the long time required for such leaching of the uncalcined polyhalite such methods probably would not be very useful in any industrial process.

However, the decomposition of calcined (450 deg. C. for 30 minutes) polyhalite when treated with saturated salt solution at the boiling point is very much more rapid, complete extraction being obtained within 1 hour with 2.4 parts of NaCl solution.

California's Dolomite

TOTAL PRODUCTION of dolomite in California for 1929 totalled 58,644 tons valued at $156,928, an increase of some 20,000 tons over 1928.

Researches on the Rotary Kiln in Cement Manufacture†

Part VIII—Temperatures at Which Calcium and Magnesium Carbonates Decompose in the Cement Rotary Kiln

By Geoffrey Martin

D.Sc. (London and Bristol), Ph.D., F.I.C., F.C.S., M. Inst. Chem. Eng., M. Inst. Struct. Eng., M. Soc. Pub. Analysts, F. Inst. Fuels; Chemical Engineer and Consultant; Former Director of Research of the British Portland Cement Research Association; Author of "Chemical Engineering"

THE THEORY of the expulsion of carbon dioxide from carbonates is well known and is explained in works on physical chemistry.

The reaction is reversible, and takes place according to the equation:

$$\underset{\text{Calcium carbonate}}{CaCO_3} \rightleftharpoons \underset{\text{Lime}}{CaO} + \underset{\text{Carbon dioxide}}{CO_2}$$

Corresponding to each particular temperature T there is a definite fixed pressure p of the carbon dioxide, such that if the pressure of the carbon dioxide in the surrounding atmosphere be *less* than this pressure, the calcium carbonate will completely decompose, thus:

$$CaCO_3 \longrightarrow CaO + CO_2,$$

whereas, if the surrounding pressure of the carbon dioxide be greater than this, the lime will be completely retransformed into $CaCO_3$, thus:

$$CaCO_3 \longleftarrow CaO + CO_2.$$

The following is a table of these dissociation pressures taken from John Johnstone's results,[1] which are the most accurate determinations to date, and have recently been confirmed:[2]

Temperature Deg. C.	Equilibrium pressure of carbon dioxide Mm.	Temperature Deg. C.	Equilibrium pressure of carbon dioxide Mm.
500	0.11	800	168
550	0.57	850	373
600	2.35	898	760
650	8.2	900	773
700	25.3	950	1490
750	68.0	1000	2710

These pressures are connected by the formula:

$$\log p = -\frac{9340}{T} + 1.1 \log T - 0.0012T + 8.882$$

where p = the equilibrium pressure of the CO_2 expressed in millimeters of mercury,

T = the absolute temperature expressed in deg. C.,

and are plotted in a curve, as illustrated in Fig. 10. At 898 deg. C. the equilibrium pressure of the evolved carbon dioxide is 1 atmosphere. This merely means that if the CO_2 in the surrounding atmosphere exerts a pressure slightly *less* than 1 atmosphere, the calcium carbonate will completely decompose if kept at 898 deg. C. for a sufficient length of time, whereas if the CO_2 pressure be slightly greater than 1 atmosphere, no decomposition ensues, no matter how long the $CaCO_3$ be heated to 898 deg. C.

It is obvious, therefore, that the rate at which the calcium carbonate decomposes depends almost entirely upon the conditions under which it is heated, *e.g.*, if the calcium carbonate is heated in a rapid current of gas free from carbon dioxide, so that the carbon dioxide is removed from the material almost as rapidly as evolved, the rate of decomposition will be far more rapid than if the $CaCO_3$ be heated in an atmosphere of gas containing much CO_2.

Consequently, although the dissociation of $CaCO_3$ under atmospheric pressure in an atmosphere of CO_2 will only proceed to completion at a temperature about 898 deg. C., nevertheless, in a rotary kiln, where the mass is heated in a current of gas of which only a percentage consists of carbon dioxide, the decomposition will proceed almost to completion at a fairly rapid rate before this temperature is attained. We can, however, calculate the temperature at which the decomposition of the $CaCO_3$ begins in the rotary kiln as follows:

Calculation of the Temperature at Which $CaCO_3$ Begins to Evolve CO_2 in a Rotary Cement Kiln

Assume as approximately correct in ordinary practice that the weight of CO_2 expelled from the slurry is half the weight of

Editor's Note

THIS ARTICLE should prove just as interesting and valuable to the lime manufacturer as to the cement manufacturer, because it discusses the theory of the expulsion of carbon dioxide from calcium carbonate under varying conditions of temperature and pressure, as met with in the rotary kiln. The latter part of the article deals with cement kiln design on scientific lines, for maximum possible output, rather than by the rule-of-thumb methods now largely in vogue.

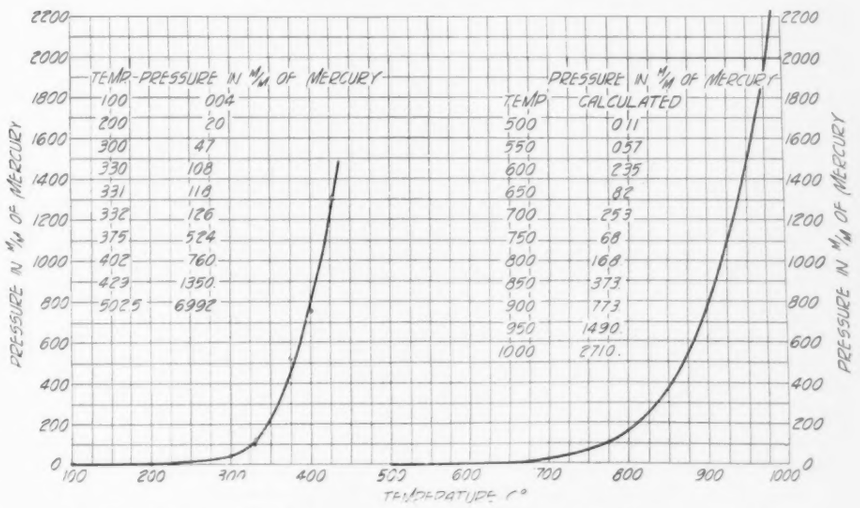


Fig. 10. Curves showing rate of dissociation of carbon dioxide from carbonates at various temperatures and pressures

†Copyrighted by author, all rights reserved.

*Wherever tons are used in this article the British ton of 2240 lb. is meant. To convert to American net tons, multiply by 1.12.

[1] *John Johnstone*, "The Thermal Dissociation of Calcium Carbonate," *Jour. Amer. Chem. Soc.*, 1910, xxxii, 938.

[2] *Pierre Jolibois et Bouvier, Comptes Rendus*, 1921, 172, 1182-1183.

the clinker produced, also that 100 tons* clinker are produced by burning 30 tons* of coal containing 70% carbon. Then CO_2 from the slurry is 50 tons* and CO_2 from the coal is 77 tons,* so that 1 part of CO_2 consists of $\frac{50}{127}$ parts from slurry and $\frac{77}{127}$ from coal, or 24 parts of CO_2 consist of 9.5 from slurry and 14.5 from coal.

Hence we deduce that if the *exit gas* from the kiln consists of 24 volumes CO_2, 1 volume O and 75 volumes N per 100 volumes, this gas, as it comes from the sintering zone, and before enriched with the carbon dioxide from the chalk, will have the $CO_2 = 16\%$, $O_2 = 1.1\%$, $N = 82.9\%$ composition by volume. Hence *the partial pressure* of the CO_2 in the furnace gases as they leave the sintering zone must be 0.16 atmosphere = 122 mm. of mercury, and as they *leave* the *calcining zone* must be 0.24 atmosphere = 182 mm. of mercury. This is illustrated in Fig. 11.

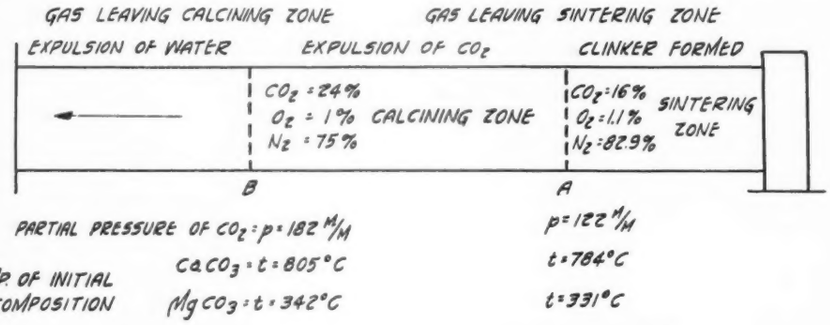


Fig. 11. Analysis of exit gases from rotary cement kiln

Now, referring to the curve of equilibrium pressure for the CO_2, we see that when $p = 122$ mm., the temperature at which the chalk begins to decompose is 784 deg. C., whereas when $p = 182$ mm., the temperature of initial decomposition of the chalk is 805 deg. C.

Conclusion

In a rotary cement kiln worked under normal conditions the chalk feed begins to evolve carbon dioxide at 805 deg. C., but as it approaches the sintering zone the temperature at which it begins to evolve CO_2 is reduced to 784 deg. C.

Practically, this means that the evolution of carbon dioxide from chalk is almost infinitely *slow* when its temperature is 805 deg. and 784 deg. C. respectively at the points *B* and *A* respectively in the kiln, but as the temperature of the raw material increases beyond these limits, the rapidity of expulsion is *rapidly increased.*

By the time the temperature of the chalk has reached 900 deg. C. under these conditions the *bulk* of the carbon dioxide probably has been expelled, the last traces being eliminated probably at 1100 deg. C.

It should be observed that the *time factor* is of great importance. For example, years would be required for the complete expulsion of the carbon dioxide from the chalk heated to 805 deg. C. at the point *B* of the furnace in Fig. 11, where it is exposed to an atmosphere consisting of $CO_2 = 24\%$, $O = 1\%$, $N = 75\%$. Whereas, if the chalk be heated in the same atmosphere, to, say, 900 deg. C. and maintained thereat, probably a few minutes will suffice. Unfortunately, the exact *times* required for decomposition are quite unknown. Indeed, it would be very desirable to determine the *minimum time* of passage of chalk through the calcining zone of a furnace maintained at different temperatures, say, 800 deg. to 1100 deg. C., in order to arrive at this constant for the different temperatures. The influence of the varying speeds of the kiln gases over the surface of the hot chalk would also have to be investigated at the same time.

Having collected such data, one would be then in a position to design a kiln on scientific lines so as to work it for a maximum possible theoretical output.

At the present time kilns are designed on more or less rule-of-thumb methods founded on practical experience, as the engineers who design such kilns have never been supplied with the chemical and physical data whereon to base their dimensions and speed of passage.

Calculation of the Temperature of Decomposition of Magnesium Carbonate in the Rotary Cement Kiln

In the case of magnesium carbonate, Marc and Simek[3] determined the dissociation pressures of magnesium carbonate as follows:

Temperature Deg. C.	Dissociation pressure of CO_2 Mm.	Temperature Deg. C.	Dissociation pressure of CO_2 Mm.
100	0.04	332.0	126
200	2.00	375.0	524
300	47.00	402.0	760=1 at.
330	108.00	429.0	1315=1.73 at.
331	118.00	502.6	6992=9.2 at.

The pressures are connected by the formula:

$$\log p = \log B + N \log T,$$

where p = pressures in atmospheres.
$B = -47.271$.
$N = 16.70$.

The curve is plotted in Fig. 10.

Taking as before the partial pressure of the carbon dioxide in the furnace gases as ranging from 122 mm. at point *A* (end of sintering zone) to 182 mm. at *B* (end of calcining zone), we get the corresponding temperatures of initial decomposition of the magnesium carbonate as 331 deg. C. at point *A* and 342 deg. C. at point *B*.

At these two temperatures, then, in the kiln and at the two places the evolution of CO_2 from $MgCO_3$ is infinitely slow. When we heat the $MgCO_3$ above these temperatures the evolution of gas occurs at a rapidly increasing rate.

It has been found, however, that the *rate* at which the carbon dioxide is expelled from the magnesium carbonate is *very slow* below 600 deg. C.

For example, *Grunberg*[4] found that complete decomposition of the magnesium carbonate in a finite time occurred when heated in a stream of air and in a stream of carbon dioxide at 470 ± 15 deg. C. and 650 ± 20 deg. C. respectively.

According to *C. Schubert*,[5] $MgCO_3$ begins to decompose at 350 deg. C., but the process is only complete at 900 deg. C.

Appendix

For completeness' sake there are collected together the following references on this subject which have been published in the literature relating to cement:

W. B. Newbury (*Cement and Engineering News,* 1912; fully reported in the *Tonindustrie Zeitung,* 1902, **26**, ii, 1215) states that the loss of combined water and organic matter is marked at 840 deg. C. (1544 deg. F.). At 870 deg. C. (1598 deg. F.) much carbon dioxide has been expelled.

Dr. Bruhn (*Tonindustrie Zeitung,* 1903, **27**, i, 235) states that the loss of carbon dioxide from the carbonate only proceeds very slowly at 550 deg. to 600 deg. C. (1069 to 1112 deg. F.), and requires a temperature at 800 to 1000 deg. C. (1472 to 1832 deg. F.) in order to proceed rapidly to completion.

E. C. Soper ("Report on a Test on a Portland Cement Plant," *Engineering News,* 1905, liv., No. 25, p. 664) gives the temperature at which the evolution of carbon dioxide becomes active as 540 deg. C. (1000 deg. F.). This must be considerably too low.

H. S. Spackman (*Tonindustrie Zeitung,* 1906, **30**, i, 847) states that the temperature at which the main amount of carbon dioxide is expelled is 812 deg. C. (1494 deg. F.), this process being completed by the time the temperature of the mass has attained 1000 deg. C. (1832 deg. F.).

Dr. Brendall (*Tonindustrie Zeitung,* 1908, **32**, 1084) puts the temperature at which carbon dioxide begins to be rapidly evolved in the rotary kiln as 750 deg. C. (1382 deg. F.), the process being practically finished at 950 deg. C. (1742 deg. F.).

J. H. Schutt (*Tonindustrie Zeitung,* 1913, **37**, 2037; 1914, **38**, 1021) assumed that the temperature at which carbon dioxide is expelled in the rotary kiln lies between 750 deg. C. (1382 deg. F.) and 1100 deg. C. (2012 deg. F.).

Dr. Otto Dormann (*Tonindustrie Zeitung,* 1914, **38**, 150, 405, 1741) states that carbon dioxide begins to escape in traces at 400 deg. C. (732 deg. F.). It is perceptibly rapid at 700 deg. C. (1292 deg. F.), and at 800 to 900 deg. C. (1472 to 1652 deg. F.) for the most part has been expelled.

The cement raw material, however, only loses

*Tons in each instance are British tons of 2240 lb. To convert to tons of 2000 lb. multiply by 1.12.

[3] *Robert Marc and A. Simek,* "The Thermal Dissociation of Magnesium Carbonate," *Zeitsch. Anorg. Chem.,* 1913, **82**, 17-49.

[4] *Grunberg, Zeitsch. Anorg. Chem.,* 1913, **80**, 337.

[5] Dissertation, *Tech. Hochsch. Dresden,* 1912; also *Zeits. f. Elektrochem., 1912,* **18**, 729.

the last trace of carbon dioxide at 1100 deg. C. (2012 deg. F.).

Dr. A. Moye[6] (1920) states that the temperature at which limestone begins to lose its carbon dioxide in a lime kiln depends to some extent upon the pressure of the surrounding pressure of the CO_2. Consequently, the evolution of CO_2 does not begin at, say, 500 deg. C. (932 deg. F.), as it would in the absence of a surrounding atmosphere at CO_2, but first at 800 deg. C. (1472 deg. F.). At 900 deg. C. (1652 deg. F.) the dissociation pressure reaches the average pressure of the atmosphere, viz., 15 lb. per sq. in., and consequently the free evolution of the gas is not hindered after this temperature is reached by the pressure of the surrounding carbon dioxide.

W. J. Cooper[7] (1921) states that in his own experience he found calcium carbonate to be decomposed in part below 600 deg. C. (1112 deg. F.) and to a great extent at or about 700 deg. C. (1292 deg. F.), but that the time factor appears to be of considerable importance.

The latter author gives the following additional references to:

Eckel, 1300 deg. F. = 708 deg. C.

Meade, 900 deg. F. = 482 deg. C., which seems a low figure.

Blount, 812 deg. C. = 1494 deg. F. He further states that dissociation begins at about 400 deg. C. = 752 deg. F.

C. E. Davis, 2000 deg. F. = 1093 deg. C.

Martin, 812 deg. C. = 1494 deg. F. at 753 mm. pressure.

Le Chatelier, 812 deg. C. = 1494 deg. F. Elsewhere he states that it ranges from 890 deg. C. (1634 deg. F.) to 930 deg. C. (1706 deg. F), according to physical conditions.

Tables Annuelles, 900 deg. C. = 1652 deg. F

Bornstein's Tabbellen, 887 deg. C. (1629 deg. F.) to 911 deg. C. (1672 deg. F.).

Nernst's Curve, about 830 deg. C. = 1526 deg. F.

Journal American Chemical Society, p. 938, August, 1910. A carefully performed estimation gives the figure at 898 deg. C. = 1648 deg. F.

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[6]A. Moye, "Theorie des. Kalkbrennens," *Tonindustrie Zeitung*, 1920, **44**, 524, Nr. 54.

[7]"Consumption of Heat in Rotary Kilns," "British Portland Cement Research Association Quarterly Report for Three Months Ending 31st December, 1921," p. 9.

(*To be continued*)

Progress and Developments in British Concrete Methods

MANY INTERESTING facts are contained in a series of articles written by J. Singleton-Green on the progress and development of British concrete construction, written for *Municipal Engineering Sanitary Record* and abstracted by C. H. Badger in *Chemical Abstracts*. In his introduction the author says that cements now on the market may be divided into natural, which are relatively unimportant, and artificial. Artificial may be divided into "portland" and "non-portland." White cement may or may not be a portland cement. Two of the three white cements, true portland cements now in use in Great Britain, are imported from the United States.

There is need of standard specifications for rapid-hardening portland cements. Since the principal raw material, bauxite, used in aluminous cements is imported, their cost limits their use to work where speed is important. Two such cements are now in use. Portland blast-furnace cement is made by mixing portland cement clinker and not more than 65% of granulated blast-furnace slag and then thoroughly grinding together.

Discussing the subject coloring materials as admixtures in concrete, the author contends that since aggregates are the chief material in concrete, these should be made, if possible, to give the desired colors and textures. The other method, though probably not as satisfactory, is by admixing dyes and pigments. The only suitable type of dye is covered by patents.

Pigments should be able to withstand the alkali due to the liberation of lime in the setting and afterward all weather conditions. Organic colors are unable to resist light and alkali. The artificial oxides, such as Fe, Mn and Cr, are better than the natural, since they are purer and more uniform in quality. The color is best mixed in the cement by dry grinding. The tinting power and also the cost increase with the degree of fineness. Not over 10% of color by weight of cement should be used, since, with few exceptions, the addition of color reduces the strength of the concrete.

High-Early-Strength Concrete

Ordinary cements cannot do the work of rapid-hardening cements in every respect, but their possibilities have been somewhat overlooked. High-early-strength concrete may be obtained with ordinary portland cement by (1) choosing a good cement, (2) using a rich mix and a low water ratio, (3) mixing for at least two minutes and curing thoroughly at as high a temperature as practicable, and (4) using a suitable admixture. Hydrated lime may be used up to 10% by weight of the cement.

Workability of Concrete

Workability will be increased by using more binder in proportion to filler. A less costly method is to combine the fine and coarse aggregates more advantageously or to use aggregates that have better grading. Harsher aggregates require more fine material in the mix, but not necessarily more cement, to produce concrete of the same workability as rounded fragments.

The variation of workability which may be obtained by varying the amount of water used is very limited except for a very rich mix. Certain admixtures on the market have been advertised to improve the workability. These are (1) fine silica, limestone dust, kaolin, clay, etc., which are inert in the mix but act principally as lubricating agents, (2) hydrated lime, blast-furnace slag, natural cements, etc., which add to the preceding properties the ability to react in the mix and have some cementitious value in themselves, (3) diatomite and other porous or cellular materials that have a water-holding sponge effect, and (4) materials that form a gel or colloid in the mix. These prevent the segregation of the aggregate.

Reinforced Concrete in Sea Water

It is often difficult to judge how much of the failure of concrete in sea water is due to the chemical action of dissolved salts and the physical action of waves, ships, cutting by sand, etc. Disintegration evidenced by cracks, softening and surface peeling is now generally believed to be due to the chemical action of the sulphates in the sea water on the uncombined lime in the cement. Concrete also fails because of the expanding pressure caused by the corroding reinforcement. Fine grinding of portland cement seems to be advantageous.

The usual recommendations for good aggregates apply and they should be inert and non-absorbent. While a small amount of fine material may increase workability, it should be used with care. Concrete having a slump of 3 in. to 5 in. is about right and should give strength to meet requirements.

Adequate tamping is needed to insure complete filling of the forms and no segregation of the materials. Laitance should be cleaned away before the next day's concrete is placed. Cracks in reinforced concrete may be expected in 10 years and these will cause sufficient trouble to warrant extensive repairs after 25 years.

Light-Weight Concrete

The chief difficulty in using light-weight concrete has been to obtain a reasonably high compressive strength. Light-weight aggregates are obtained (1) from cinders from boiler plants, especially selected and washed, (2) by heating crushed shale or clay to incipient fusion and intumescence, (3) from swelled bricks and burnt clay which has been prepared by pulverizing and admixing with proper flux materials or gasefying substance, such as organic material, (4) from crushed coke as obtained by high temperature coking of coal or pitch, (5) from tufa or pumice, and (6) from furnace slags from metal refining.

Sawdust concrete is cheap and light and possesses some of the advantages of timber. The difficulty with its swelling on wetting and shrinking on drying has been overcome by a secret treatment of the sawdust.

Good results are also obtained by using the correct proportion of $CaCl_2$. Cellular concrete can be made by either a chemical or a mechanical process. Thus when an alkali metal and water are mixed with the cement and other ingredients, the metal is oxidized and the liberated H_2 swells the mixture which gradually hardens in the same way as ordinary cement.

A foam mixture of soap and albumin prepared in a separate mixer is introduced by compressed air into the concrete mixer; about 1 part foam to 2000 parts concrete is used.

Concrete can be made which will float on water but which will not become waterlogged. The method of manufacturing "aerocrete" and ice concrete and their advantages are described. The strength of light-weight concretes decreases rapidly with lessened density.

The Sand and Gravel Industry and Its Problems

Part I—Of a Series of Comments by One Who Has Had Experience

By John Zollinger
Oakhurst, N. J.

SOME LITTLE TIME AGO a middle-aged man came to me, recommended for a quite responsible position. Upon inquiring into his past activities he informed me that he had been in business twice, the last venture being a farming experiment, but owing to his weak heart the thing failed. He was promptly informed that the sand and gravel business was no place for a weak heart, and a record based on failure was a very poor recommendation.

I am moved to mention this little incident, because at the time we had just about ironed out some heart-and-back-breaking propositions, and the plant was running fairly smoothly; but certainly it takes a sound heart and good judgment to get over these troubles quickly.

The road to success in this business is plastered thickly with difficulties; nothing will add any more to your worries and troubles than incompetent help or too much advice, based generally on inexperience and little thinking. Problems will arise continually, and always there will be a dozen "experts," salesmen, etc., who have the solutions at their fingertips, but who never actually solved anything. To successfully wind yourself through the maze of haphazard ideas to the ultimate solution requires serious deliberation, lots of common sense and that elusive sixth sense, which visualizes and perfects itself by intuition.

Personnel

To emphasize the importance of competent help, I am reminded of a concern which employed a man of high intelligence, and naturally had to pay him a good salary. The plant began to run smoothly and production ran up at top notch. The high-priced man seemed quite unnecessary, and it was finally decided to replace him with a cheaper man from the ranks. But somewhere something went wrong. What one man had done without any seeming effort, the successor could not do with all the sweating, swearing and raising cane in general. The discharged man was offered his position again, but refused to come back, and we are quite sure the experiment cost the firm several times the man's salary, which emphasizes the fact that some of us are born artists, some scientists, and there are those who can successfully run a sand and gravel plant. In the aforementioned incident, not only did the firm lose a valuable man, but all along the line; due to this change several men were put into positions for which they were not fitted and could not make good in.

Judgment

Some time ago the writer sold some machinery to a man starting a sand and gravel plant. This party knew very little about the business, and as we became acquainted he asked a lot of questions which could not easily be answered; and being rather conservative I turned tables and started to question him. The answers were surprising, and it seemed very incongruous to me for him to invest around $60,000 without even the chance of having a good time while spending the money. The following constitutes approximately our discourse:

What is the nature of the deposit you are going to mine? Answer: Now, just wait a minute; I shall get the superintendent and he will tell us all about it. I told him this was not necessary, since I had already conversed with that worthy, and if my guess was right (which it was), the man with the money was in for a great string of disappointments. The next questions about market opportunities, freight rates, prices, etc., were answered as vaguely and uncertainly; the poor man only knew he was going in the sand and gravel business and had absolute confidence in his superintendent, who in turn had absolute confidence in everybody who was willing to spill ideas and sell the newest developments in sand and gravel machinery.

As stated above, I am of a conservative nature and endowed with a conscience. The man had a very nice family, and at the time the writer came into the picture was as yet well fixed. I therefore decided to give him free gratis of my advice. First of all I told him to get rid of his friend, the superintendent. Lay off all your help and let some engineer investigate your deposit and determine what process of mining you might best employ. Determine your market and decide what tonnage per day you will require. Look into your freight rates, the location of competitors and, if after all this you are still willing to go ahead, employ an engineer who will for so much money in such and such a time design and build a plant that will produce so many tons per hour. Let that man supervise the work, and be sure you get a man who is willing to guarantee all he says with dollars and cents.

"My good man," he said, "if I were to listen to you this plant would not run before another three months and we want to produce in six weeks." That ended our confab, but the only thing in the line of production after the six weeks was the issuance of additional checks by the owner and a string of excuses by the eloquent superintendent. Six months later we visited the plant again and it was not finished. The owner told me he was going to sell his home in order to carry on, for he had spent so much that he could not afford to fail and ouside money could not be secured, since he really had nothing to offer but a bunch of machinery; but still calamity followed him. After getting the thing to run by hook and crook, the deposit did not warrant mining and the man was sold out and broke. This may be an exceptionally sad example, but none the less true, and this failure can be traced 100% to the man in charge who absolutely did not know his business but unscrupulously used the confidence invested in him by the owner.

Common Sense and Ability

In this chapter, which deals with the fundamentals of any successful business, namely, the executive and advisory staff, whether this be one man combining the necessary abilities or several individuals, each expert in one branch, it will devolve upon the chief executive to pick the right men.

The board of directors may vote to authorize changes and innovations; estimates and approximate costs will determine their decision, but unless competent men have figured and thought over the details, such cost estimates mean little, and the outcome will result in excited explanations and excuses; and for the directors, loss of money.

The writer recently was called into a conference in which an important change in the method of screening was contemplated. Two plans were submitted, the one estimated at a certain cost and the other amounting to double the amount. As was natural, the directors were desirous of adopting the cheaper method, since they were informed the same results would be effected. In going over the estimates I found the one method greatly under-estimated as to cost and not as efficient as the other, therefore I recommended the more expensive change. How-

ever, the cheaper plan was adopted, with the result that after the season the inefficiency of the method was acknowledged and the second method put into effect; which reminds me of some quaint advice which an old friend dished out on occasion: "If you are in need of advice, ask your three best friends and if they agree, do the opposite."

Plant Design

It is well to keep in mind that the sand and gravel industry is still in its infancy; the engineer or designer certainly has great opportunities to apply his ingenuity. There is no standard method, since every installation varies with the deposit, location, shipping method and any number of factors.

The fact that a plant is designed symmetrically and equipped with up-to-date machinery does not signify that it is making money. I have seen one little plant, hardly discernible among the piles of sand and gravel, a seemingly haphazard assembly of units; but it had made money and is still making it, which is more than can be said about some of the elaborately designed plants.

Method of Mining

There are any number of factors that will decide the method of mining; and at this point careful consideration is very important, since upon this decision hangs the success of the operation. A sufficient amount of water is the first requisite, and since this water must be disposed of and the loam, clay, etc., have to be settled, a suitable location for handling water must be available. Too little attention is generally paid to this phase of the operation, but oh, boy, what a problem it becomes later on! One firm had no end of lawsuits on account of draining and depositing the overflow on to neighboring property. Still another case comes to my mind where the waste was allowed to fill back into the dredged hole. As it happened in this case the bank consisted of an overburden of silica sand, for which apparently no market could be found. This sand filled back, and in the second season formed a filtering deposit, the water returning, seeped so slowly through this fine sand that the dredge ran out of water before the water returned. This operation consisted of an 8-in. pump, operating at natural water level, no other source being available. Since this item has to be considered, no matter what the method of mining used, it should be given very deep consideration, along with its disagreeable half-brother, the overburden, clay, roots, grits, or any waste product.

It is assumed that the composition of the deposit is first determined and test holes and records of the findings for future reference made. This must be done in order to select the proper method of mining with intelligence.

Transportation

If dry digging, the desired output will determine the size and number of shovels required; and whether conveyors or narrow-gage railroad are used for hauling the raw material the selection becomes a matter of calculation. In railway transportation I have found anything below 36-in. gage too light for satisfactory production. The light weight and comparative ease of moving track may help to decide in the selection of light weight equipment, but the second year generally brings trouble and regrets. At any rate it is well to figure a good margin of oversize capacity, then if needed production may be increased without changes. The plant will run ever so much smoother with an underload, and the chances for breakdowns are reduced to a minimum.

Human nature is a peculiar thing. I recall a plant which was equipped with 24-in. gage rails and little 2-yd. dump cars. The gas locomotives boiled and hissed, and the drivers spent most of their time fixing and repairing them. They hustled and swore and sweatted, but between the two trains of cars they could not keep the hopper full. It was then decided to put in 36-in. gage equipment and increase the output, since the rest of the plant was well able to take care of it. The proposition then reversed itself. One train kept the hopper full with time to spare and the driver kept up his lamentations because he did not have enough to do.

In mining a deposit, consisting of a good percentage of large stone and boulders, conveyor belts could hardly be considered, but for sand and light gravel we have found them quite satisfactory, providing the driving power, size of belts and thickness of belts have been carefully selected. Here, also, care should be taken to work on the margin of safety, for nothing is more disagreeable than having to slow down the whole plant for some fool piece of equipment which will not take care of its own end. It reminds me of the old-time bricklayers, passing the bricks along the line, and no matter how ambitious they all felt the slowest man determined the pace.

Sometimes the topographic features of a proposed layout may preclude the use of any but the conveyor principle. It is possible with this method to overcome grades, depressions, etc., which no other arrangement will do. However, more flexibility can be obtained with railroad transportation.

Draglines are successfully used, depending on the deposit. One drawback we have encountered in their operation was the rather cumbersome procedure of moving to new cuts. If the deposit is lined with layers of undesirable material, production is interrupted very seriously while going through this stratum, since the cut is always longitudinal and the material does not mix as well as is the case with a face bank. The replacements are rather severe with this method, and it seems to us a combination of brutal usage of machinery. However, I have records of a plant using this method showing very good results, which is due probably to the fact that little labor is necessary for its operation.

Still another internal pit transportation has been advocated lately. This equipment consists of 8-wheel or 6-wheel truck units using 4-wheel drives; we have, however, no data on hand to speak intelligently on this mode of transportation which seems to possess excellent possibilities.

Whatever means of pit transportation are employed, sturdy construction with forethought of shifting without interrupting production should be the first consideration. Too often this end is considered as only temporary and consequently put up in a slipshod and flimsy manner, whereas on the contrary, since it has to be moved often, the construction should be such as to withstand the strain. The all too frequently applied slogan "Good enough" carries a penalty which no business can afford.

The digging equipment on the market today has been improved so tremendously that very few shut-downs are occasioned. We have found a gasoline shovel to be the most satisfactory, although motors operating with crude oil are perfected to such an extent that no doubt in another year they will replace many gasoline engines.

Stripping

Some stripping is almost always necessary. A lot of it is done over the cold weather months, especially where there is a growth of trees. These should be cut down well ahead of the digging, to rot the stumps as much as possible. If the topsoil has to be removed, at times a market can be found for this product which partly pays for this operation; we do, however, figure this item as an expense and charge it to production cost. With a comparatively low bank and a heavy growth of underbrush, the stripping operation raises production cost, and in extreme cases prohibits profits, thereby making operation impracticable. Of course each plant has to handle individual problems as they arise, and we surely do not advance theories which can be applied to every condition, but I am bringing up such phases of the business which, during my connection with it, have kept my wits going, and since we all too often overlook or forget to calculate the seemingly simple things, they are apt to turn into good sized stumbling blocks. An experiment in methods of stripping, extended over a period of four years at one particular plant, finally brought the operation to one-horse dump carts, and two men to each cart, the men using grubbing hoes to remove the roots. The removal of topsoil with power shovels and tractors proved too expensive in this case and the plan to let the topsoil go through the plant and wash out with the waste water proved the most practical solution. This did not, however, take care of all the roots, but eliminated a great deal of trouble at the screens.

Blasting

Where blasting is necessary no guess work should govern. Manufacturers of explosives are glad to send their engineers to advise

and select the proper kind and strength of explosives to be used. Too often we are prone to forget that methods are forever being improved and the old ways become obsolete.

In the supervision of a sand operation a lot of blasting was being done, and it seemed to me that the shooting was very expensive and the results unsatisfactory. The man in charge of the shooting was called to account, and this particular artist was very touchy on the subject. His father had dynamited before him and he himself had lost three fingers in the art, branding him forever as an expert. The interview amounted to very little, and I decided to have an expert solve the problem for us. Within a few days a very businesslike man bustled into the plant, and after a survey the blasting tactics were radically changed with gratifying results. However the old-time blasting expert would never admit that the new method was better, and kept grumbling, which accounts for the comparatively slow progress in every line; for there are always those who are satisfied to do things the same old way; they run into the rut which leads to stagnation. We should at least be open-minded enough to admit our shortcomings to ourselves and consider that it is impossible to be an expert in every line; then be generous and fair enough to take whole-heartedly the advice sought and carry out instructions in detail.

(To be continued)

Testing Pennsylvania Highway Materials

H. S. MATTIMORE, who is engineer of tests and material investigations in Pennsylvania, writes in a recent issue of *Roads and Streets* of the Pennsylvania organization and methods of testing. A new laboratory has been built at Harrisburg and branch laboratories are maintained at Allentown and Pittsburgh. The divisions of the work are of a general nature except that there is a special laboratory for testing sand and cement because this is a specialized operation and a great deal of it has to be done. Cement is largely tested in the Allentown branch.

Twenty-four hour tests of cement are made at the Allentown and Pittsburgh branches, as it has been found that this is enough to allow cement to be shipped from approved bins. This privilege is based on 7-day and 28-day tests on the products of the plant and in cases where the cement does not consistently meet the 7-day requirements all acceptances are made on a 7-day basis. Cases are extremely rare where a cement company loses the 24-hour privilege from not meeting the 7-day requirements.

The article says that sampling, testing and inspection of cement are considered to be very important operations. Samples have to be taken by the department's own inspectors and the inspectors have to be present when the car is loaded from accepted bins. Cars are shipped under seal and contain an acceptance card which is authority for the use of the material. Supervising inspectors are responsible for these cards. A part of each sample tested is forwarded to the main laboratory for check testing, which is believed to be as advantageous to the cement company as it is to the department.

Acceptance of fine and coarse aggregates is controlled by field tests after materials produced from the source have passed laboratory quality tests. It has not been found advisable to assign inspectors to aggregate plants because there are too many of them, and it is difficult to find men for this work, as there is little incentive for future promotion with such a large force.

The department believes that it has a certain responsibility in assisting the production plants and it sends inspectors to make periodic inspections. In the case of a plant which has produced more than the usual amount of rejected material a field engineer is sent to study the conditions and to make recommendations for bettering the product. The inspection and testing of aggregates has worked out well, but this is largely due to co-operation by the producers who realize that they are responsible for furnishing good materials. Many of them, especially the larger plants, have installed their own inspection divisions where tests are made prior to making shipments of material.

Centralized control is considered essential to assure that the material in one locality will be as good as that from any other. Specifications are not interpreted broadly. The author of the article thinks that specifications which have to be so interpreted should be thrown out. The only tolerance allowed is on prepared natural aggregates to allow for differences in testing operations. It is seldom required on material properly prepared and tested by trained operators.

Cement Products Industry in Canada, 1929

MANUFACTURES of cement products in Canada reached a new high level during 1929 at $4,419,417. Records of the Dominion Bureau of Statistics at Ottawa, which are available since 1919, show that the production of cement products started at $921,478 in 1919 and advanced rapidly to $1,527,590 in 1920, then dropped slightly for a few years to again start upward in 1925 to $2,020,239 after which a new record was established each year until the present high of $4,419,417 was attained in 1929.

Ontario with 106 plants accounted for 63% of the total business; Quebec with 30 plants made 26%, Saskatchewan with 3 plants had 5%, British Columbia's 5 plants made 4% and the remaining 2% was produced by 3 plants in Nova Scotia, 3 in New Brunswick, 2 in Alberta and 1 in Manitoba.

These 153 plants had a working capital of $5,024,497 and afforded employment to an average of 1,347 people who received $1,608,238 as salaries and wages, and by manufacturing processes they added $2,916,465 to the value of purchased materials which cost $1,502,952.

TABLE 3—OUTPUT OF CEMENT PRODUCTS INDUSTRY IN CANADA, 1928 AND 1929

Items	—Total selling value— 1928	1929
Artificial stone	$1,173,645	$1,134,328
Cement hollow building blocks, etc.	1,158,508	902,413
Cement sewer pipe and culvert pipe	1,148,168	1,450,665
Cement drain pipe	145,908	95,711
Cinder blocks	192,358	306,228
Cement bricks	40,007	178,257
Cement posts, poles, etc.	17,748	19,843
Other products*	260,613	331,972
Total	$4,136,955	$4,419,417

*Includes laundry tubs, stucco mortars, vaults, trays, etc.

Proposed Federal Specifications on Gypsum Plaster and Plaster Board, and Hollow Concrete Blocks

THE Federal Specification Board, Washington, D. C., is submitting to representative manufacturers for their comment and criticism new and revised specifications on gypsum plaster and plaster board, and hollow concrete blocks, for the future use of the government departments. Copies of such proposed specifications may be obtained from the board, and it would be glad to receive any comments or suggestions as to changes which may be thought desirable. Any such comments should be received not later than six weeks from October 9.

TABLE 1—PRINCIPAL STATISTICS OF THE CEMENT PRODUCTS INDUSTRY IN CANADA, 1925–1929

Year	Number of plants	Capital employed	Average number of employes	Salaries and wages	Cost of materials at works	Selling value of products at works	Value added by manufacturing
1925	197	$2,594,736	819	$ 697,716	$ 730,296	$2,020,239	$1,289,943
1926	185	2,857,752	922	778,662	880,041	2,544,242	1,664,201
1927	151	2,671,273	872	936,053	912,686	2,663,065	1,750,379
1928	151	4,140,543	1,262	1,466,508	1,261,653	4,136,955	2,875,302
1929	153	5,024,497	1,347	1,608,238	1,502,952	4,419,417	2,916,465

TABLE 2—PRINCIPAL STATISTICS OF THE CEMENT PRODUCTS INDUSTRY IN CANADA, BY PROVINCES, IN 1928 AND 1929

Provinces	1928 —Number of— plants	employes	Selling value of products	1929 —Number of— plants	employes	Selling value of products
Nova Scotia	3	13	$ 9,116	3	10	$ 10,365
New Brunswick	3	11	13,934	3	12	29,851
Quebec	34	483	1,324,561	30	413	1,145,674
Ontario	105	675	2,441,717	106	796	2,790,439
Manitoba and Alberta	3	44	200,755	3	21	51,126
Saskatchewan				3	43	231,961
British Columbia	3	36	146,872	5	52	160,001
CANADA	151	1,262	$4,136,955	153	1,347	$4,419,417

Emulsifying Action of Asphalt Fillers

With the Conclusion That Limestone, Lime, Magnesium Carbonate and Portland Cement Fillers Are the Right Ones

By A. R. Ebberts

Former Engineer of Tests, Allegheny County, Penn., Now with Colprovia Roads, Inc., New York City

THERE ARE MANY DIFFERENCES in the properties of paving mixtures for which no adequate explanation is apparent. The most serious of these are compressibility and resistance to water action. Contradictions arise in attempting to relate grading and voids of the aggregate to these two properties. The effect of various fillers has always been more or less unpredictable and haphazard. Grain shape, nature of surface, voids and other characteristics all have failed as dependable criteria. Many of these discrepancies seem to be explained by the results of the experiments described. Interfacial forces are extremely powerful and the fundamental principles involved are so diverse that it is rash to make predictions in advance of experiment when dealing with them. This the contradictory phenomena mentioned may be expected.

The emulsifying action of various dusts used as fillers was studied. For convenience an asphaltic oil was used for the demonstrations as a matter of routine. Sufficient checks were run with a paving cement of 60 penetration, to assure that the results would be comparable with those arrived at with the oil. These check experiments were run in exactly the same manner as those with the oil except that the materials were heated and the bottles kept in a water bath at 210 deg. F. The asphaltic oil was introduced into small cylindrical glass bottles such as are widely used for oil samples. An equal volume of distilled water was added to each bottle and into each was introduced one of the fillers in amount equal by volume to about one-fourth the total volume of oil and water. The bottles were shaken by hand and immediately the results obtained divided them naturally into two groups. One group consisted of emulsions of asphalt in water, and the other of emulsions of water in asphalt. In Fig. 1, emulsion A is of the asphalt in water type and was obtained by the use of silica dust. Emulsion B is of the water in asphalt type and was produced with the aid of limestone dust. The blacker appearance of B, which has water as dispersed phase, is due to the asphalt as continuous phase being able to wet completely the walls of the bottle.

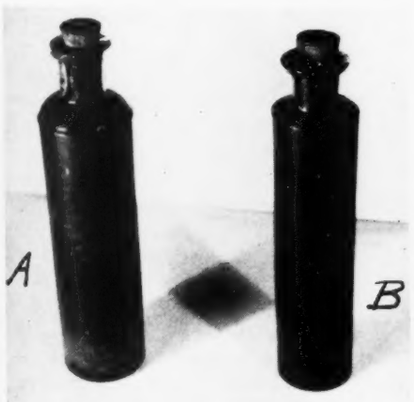


Fig. 1. Test emulsions for studying action of various dusts

As a check, small portions of the various emulsions were poured into water. The asphalt in water emulsions mixed readily with the water and the water in oil emulsions did not, as shown in Fig. 2. In all cases the dust serving as emulsifying agent was found suspended in the continuous phase, but this cannot be accepted as an invariable principle, as various students of emulsification have shown.

At the suggestion of J. S. Miller of the Barber Asphalt Co., an attempt was made to determine whether variations in the ratio of filler to asphaltic oil would have any effect on the phase of either group; 25 gms. each of asphaltic oil and distilled water were used in each experiment and the following quantities of filler added:

12½ gms. of silica dust gave a poor emulsifying action of the A type.

25 gms. of silica dust gave a distinctly A type emulsion.

37½ gms. of silica dust gave a distinctly A type emulsion.

50 gms. of silica dust gave a distinctly A type emulsion.

12½ gms. of limestone dust gave a distinctly B type emulsion.

25 gms. of limestone dust gave a distinctly B type emulsion.

37½ gms. of limestone dust gave a distinctly B type emulsion with a little water left over.

50 gms. of limestone dust gave a similar result to 37½ gms.

The following substances gave asphalt in water emulsions. Group A:

Silica
Iron oxide
Gypsum
Slag?

The following substances gave water in asphalt emulsions. Group B:

Limestone
Magnesium carbonate
Hydrated lime
Magnesium hydrate
Portland cement
Slag?

Objections to Silica Fillers Well Founded

Considering the significance of these results in relation to an asphalt pavement, it is obvious that fillers of the Group A type are to be avoided. A wet pavement being worked under traffic, in the presence of a Group A filler, will tend to disperse asphalt in the surface moisture to be lost through drainage. This may explain why so many

Fig. 2. Water test of various emulsions

Editor's Foreword

THIS is likely to prove one of the most important articles Rock Products has ever published. It gives proof, for the first time, that asphalt fillers should always be of a group which comprises limestone, hydrated lime, magnesium carbonate, magnesium hydrate, portland cement and possibly some slags. Silica fillers should not be used. The reasons undoubtedly lie in physical chemistry—the difference in reactions between asphalt and basic and acid minerals. For the same reasons limestone aggregates give better results in asphaltic concrete.

It is our own belief that the significance of these tests and their results to limestone aggregate producers is hardly less than that of the U. S. Bureau of Standards tests of the fire resistance of aggregates, some years ago, which once and for all time removed the handicap of limestone aggregates in fireproof concrete structures.

authorities have recorded their dislikes for silica fillers without being able to give any reason for it, except a vague impression that pavements made with them are not as impervious to water-action as others. A Group B compound probably is essential to the success of an asphalt pavement and it must be present in sufficient quantity to prevent the formation of an oil in water emulsion. Since the activity of these materials increases very rapidly with their fineness, the best way to add them to the mix is as filler.

The only alkaline earth compound tried, that gave an oil in water emulsion, was calcium sulphate. This was the case when the calcium sulphate was introduced, both as native gypsum with two molecules of water of crystallization and as "plaster of paris" with one-half molecule of water of crystallization. The powerful sulphate ion evidently overrules the influence of the calcium ion. Emulsification was incomplete and not strictly typical.

Another peculiarity noticed is the varying effect of different samples of slag dust. One sample gave a distinctly Group A emulsion. Three samples acted like mixtures of silica and limestone dusts in varying proportions.

A mixture of silica and limestone dusts in equal parts by volume gave a Group B emulsion of water in oil, but it was difficult to make the emulsion complete. Some of the water would not emulsify into the asphalt, and this water carried a large proportion of suspended dust, found to be silica. This suspension was sufficient to prevent the adherence of the asphalt to the sides of the bottle. Ten per cent. of the limestone dust mixed with silica dust was found to be sufficient to inhibit the formation of a Group A emulsion, but not sufficient to cause the formation of a Group B emulsion to any great extent.

Limestone Best Aggregate for Asphaltic Concrete

In asphaltic concretes using crushed limestone as coarse aggregate, the filler problem is less acute, as often there is enough limestone surface area present to overcome the effect of any added filler, but this is not always the case. Where trouble is experienced in getting the asphalt to stick to the aggregate, the addition of a little hydrated lime to the mix will overcome the difficulty. This can be demonstrated experimentally with paving cement, water and filler, stirred hot. The mixtures containing Group A fillers will show much less tendency to stick to the sides of the beaker and to the stirring rod than those containing Group B fillers.

Emulsions of either type will adhere to pea gravel or limestone chips, due to their absorptive surface. Adding limestone chips to the Group A emulsions caused them to break and separate into oil and water. The oil wet the chips and the fillers stayed with the water. Group B emulsions wet limestone chips without other effect. Pea gravel dropped dry into either type of emulsion when stable was coated by the emulsion. Wet pea gravel was coated by Group A emulsions but not by Group B emulsions. These experiments were suggested by W. J. Emmons of the University of Michigan.

There are on the market prepared emulsions of asphalt in water meant to be mixed cold with mineral aggregates. Their makers claim that, on contact with the mineral aggregate, the asphalt will stick to it and the water run off without loss of asphalt. The efficiency of this breaking of the emulsions depends on the nature of the aggregate. The predominance of calcareous materials for this purpose explains their success. Otherwise, the breaking of the emulsion might be entirely dependent on the mechanical spreading of it in thin films on the surface of the aggregate.

Tests in Running Water

Professor Emmons also suggested that compressed pavement specimens be subjected to soft scrubbing action under running water. The following experiments were devised:

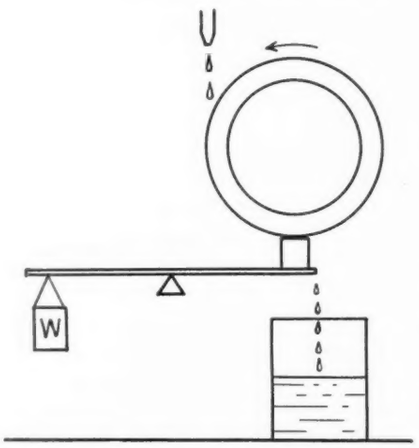


Fig. 3. Method used for carrying out rubber-tired abrasion test

Two cylinders were made up, one with silica dust and asphalt, the other with limestone dust and asphalt; 30 gms. of Mexican asphalt cement of 60 penetration was used in each case and the fillers added to the limit of workability at 400 deg. F. The mixtures were then loaded with a Hubbard and Field stability mold and compressed at 3000 lb. per sq. in.

Following is the data on the two cylinders:

Nature of filler	Silica	Limestone
Sp. gr. of filler	2.60	2.83
Gms. of filler used to 30 gms. A.C.	108.2	173.7
Vol. of cylinder obtained	69.6 cc.	89.1 cc.
Vol. of filler	41.6 cc.	61.3 cc.
Vol. available for A.C.	28.0 cc.	27.8 cc.
Sp. gr. of A.C.	1.04	1.04
Vol. of A.C. used	28.8 cc.	28.8 cc.

The cylinders were then placed in the Abbé mill, one in each crock. These porcelain crocks had a capacity of four liters and were filled half full of water. At the end of each 24 hr. the cylinders were removed, dried with a towel and weighed. The loss in weight in percentage is given in the accompanying table.

TABLE SHOWING LOSS OF WEIGHT IN ASPHALT TEST CYLINDERS COMPARING SILICA SAND AND LIMESTONE FILLERS

	% Loss in weight	
No. of days	Silica	Limestone
1	0.07	0.15
2	0.15	0.25
3	0.22	0.30
4	0.52	0.35
5	0.81	0.75
6	0.96	0.90
7	0.96	1.04
8	1.25	1.44
9	1.25	1.99

TABLE SHOWING ORIGINAL WEIGHTS, LOSS OF WEIGHT AND PERCENTAGE LOSS OF ASPHALT CYLINDERS IN WATER TEST

	Limestone			Silica		
Date	Wt.	Loss	%	Wt.	Loss	%
2-11-29	200.9	....	.....	135.5	....	.....
12	200.6	0.3	0.15	135.4	0.1	0.07
13	200.4	0.5	0.25	135.3	0.2	0.15
14	200.3	0.6	0.30	135.2	0.3	0.22
16	200.2	0.7	0.35	134.8	0.7	0.52
19	199.4	1.5	0.75	134.4	1.1	0.81
20	199.1	1.8	0.90	134.2	1.3	0.96
21	198.8	2.1	1.04	134.2	1.3	0.96
22	198.0	2.9	1.44	133.8	1.7	1.25
23	196.9	4.0	1.99	133.8	1.7	1.25

The water in the crocks was changed after the fifth day. Both crocks contained some small ravelings of mixture from the edges of the cylinders. The water in which the silica cylinder was tumbled contained suspended matter which would not settle. When shaken out with carbon bisulphide it gave up enough asphalt to color the solvent distinctly. The water in which the limestone cylinder was tumbled settled clear in a few minutes. No definite coloration was imparted to carbon bisulphide by shaking with this water. On the other hand the mineral matter in the bottom of the crocks carried more asphalt in the case of the limestone than in the case of the silica. Small pieces of the limestone dust and asphalt mixture would cohere in the presence of moisture, but pieces of the silica dust and asphalt mixture would not.

Rubber-Tired Abrasion Test

Similar cylinders were then subjected to the abrasion of a rubber tire on a small toy-wheel. The cylinders were held against the wheel by a balance beam, the arms of which were of equal length. The beam was counter poised and 500 gm. added to the end opposite that carrying the cylinder. Water was dripped on the wheel in sufficient quantity to keep the tire and test-piece flooded (Fig. 3.) The wheel turned at a speed of 192 r.p.m. and was 20.6 cm. in diameter. At the end of five hours each cylinder showed a small depression worn in it by the tire. The water from the silica cylinder test showed suspended asphalt by shaking with carbon bisulphide. The water from the limestone cylinder test did not.

The comparative function of the above experiments would be enhanced had the fillers used been nearer alike in grading, voids

and superficial area. They graded as follows:

Passing	Retained	Silica	Limestone
....	50	1.0	None
50	200	6.5	21.0
200	.....	92.5	79.0
Loss by elutriation.....		74.9	43.5

Conclusions

In conclusion, it might be said that the foregoing results indicate the advisability of using as high a percentage of calcareous materials in the paving mixture as conditions permit. If this is the case, under no circumstances would the use of aggregates of 100% siliceous nature be justified. When siliceous materials are most easily available or cheapest, the indications are that the addition of a small percentage of calcareous material will serve to make them neutral. It should be added as filler, as its effectiveness varies directly with its total superficial area. As to what the controlling factor in relation to phase actually is, authorities differ. The surface tension of a solid cannot be measured, so it is a convenient thing on which to blame these phenomena. It probably governs which liquid will most readily wet the solid and bears some simple relation to the "energy of adhesion" often put forward as a factor in emulsification of solids.

Acknowledgment

The author acknowledges the helpful suggestions of A. W. Dow, J. S. Miller and Prof. W. J. Emmons.

He also wishes to thank J. L. Sigal for his assistance with the laboratory work.

References

Mineral Fillers in Sheet Asphalt Paving Mixtures—Yasuhei Emori—*Proc. 14th Annual Conference on Highway Engineering,* U. of Mich., 1928.

* * * * *

Factors Affecting the Stability of Asphalt Paving Mixtures—Francis P. Smith—*Proc. 6th Annual Asphalt Paving Conference,* 1927.

Feldspar in Canada in 1929

SHIPMENTS of feldspar by Canadian producers during 1929 increased 17.6% in quantity and 19.5% in value over the totals for 1928, according to finally revised statistics just issued by the mining, metallurgical and chemical branch of the Dominion Bureau of Statistics at Ottawa. The production in 1929 amounted to 37,527 tons valued at $340,471 as against 31,897 tons worth $284,942 produced in 1928.

Crude feldspar exported from Canada during 1929 totaled 29,896 tons valued at $242,915; these exports were principally to the United States. An increase of 24.7% was recorded in the imports of feldspar into Canada in 1929. Importations during the year amounted to 3955 tons appraised at $65,997 as against 3,171 tons at $53,818 in 1928.

The 19 firms in operation during the year reported a total capital investment of $223,443. Salaried employes and wage-earners engaged in this industry totaled 209 and their combined earnings were $164,440. Fuel costs for the year amounted to $14,122.

PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF FELDSPAR, 1929

	Quantity tons	Value
Production:		
Quebec	15,790	$133,492
Ontario	21,737	206,979
Total	37,527	$340,471
Imports	3,955	$ 65,997
Exports	29,896	242,915

PRINCIPAL STATISTICS OF THE FELDSPAR INDUSTRY IN CANADA, 1928 AND 1929

	1928	1929
Number of firms	20	19
Capital employed	$237,400	$223,443
Number of employes:		
On salary	8	9
On wages	215	200
Total	223	209
Salaries and wages:		
Salaries	$ 14,172	$ 19,936
Wages	$130,488	$144,504
Total	$144,660	$164,440
Cost of fuel and electricity	$ 12,898	$ 14,122
Selling value of products	$284,942	$340,471

Improved Method of Producing Granular Feldspar

AN IMPROVED METHOD of producing granular feldspar for use in the manufacture of glass is noted in an article in a recent issue of *Ceramic Industry* by B. C. Burgess of the Tennessee Mineral Products Corp. Possibly the same method could be used for other rock products.

To meet the demand for a more granular and dustless material this company developed a new process of grinding, which it is stated produces only about one-tenth the amount of fines of the present process, and in connection with this have utilized an induction type separator to materially reduce the iron content of the feldspar.

The advantages claimed for this new product are that it flows more freely, is dustless, lessens batch separation when used with other granular ingredients, requires less heat, and makes a quicker and more uniform melt.

Without induction separation it has been difficult to hold the Fe_2O_3 content below 0.1%, whereas with this method of removing the iron it ran from 0.05% to 0.06% on commercial tests.

In reducing the iron content various types of concentrating equipment, including dry and wet tables and magnetic and electrostatic separators were tried out, and finally an induction type of machine was built, which gave very satisfactory results in removing not only magnetic and feebly magnetic minerals, but such particles as muscovite mica.

This improved process has been installed at Minpro, N. C., the material from the dryer being passed over screens in closed circuit with the mill so that it is reduced to 20-mesh. It is then separated over another screen into two sizes and fed to the magnetic separator and from there automatically sampled and stored in mixing or blending bins.

The great difference in the screen size of the product as compared with ordinary 20-mesh material is shown in the accompanying diagram of screen tests of the new and old grinding processes.

While the process has been used only for the production of granular spar, it is believed to be equally applicable to the grinding of other materials where maximum coarseness and minimum fines are desired.

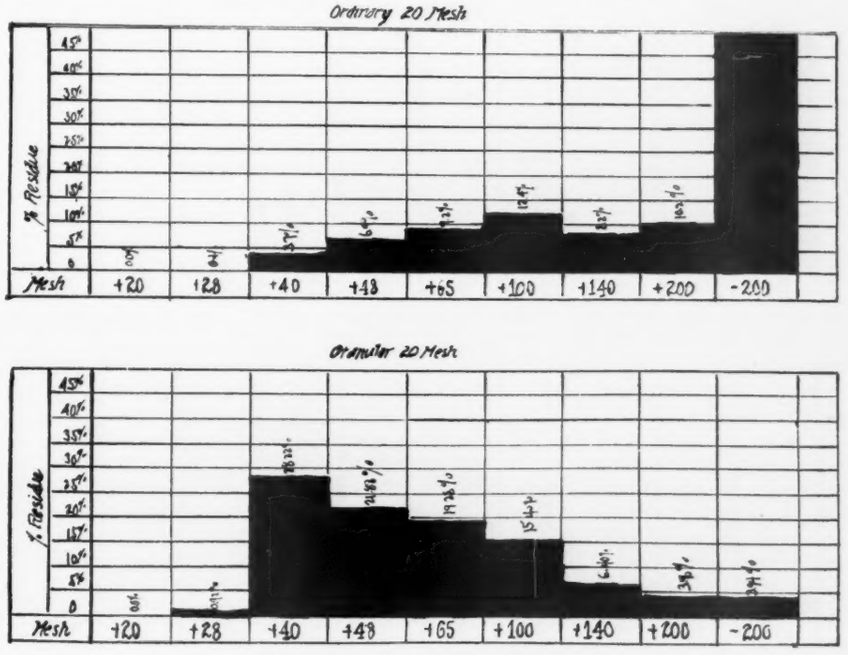


Diagram of screen tests in old and new process of grinding granular feldspar

Study of a Group of Crushing Plants in the Central West

Part IV—Quarry Loading and Transportation

By Earl C. Harsh
Associate Editor, Rock Products

THE FIRST three parts of this series of articles have appeared in Rock Products, August 16, September 13 and October 11. The group of plants included in this study numbered 30. In discussing the methods employed in the various operations the attempt has been made to offer suggestions and constructive criticism based on an impartial study of various plants. For this and other reasons it is desirable to omit data which would in any way identify the various plants by name of company or locality.

In this quarry a 1 1/2-yd. electric crawler type shovel loads to trucks

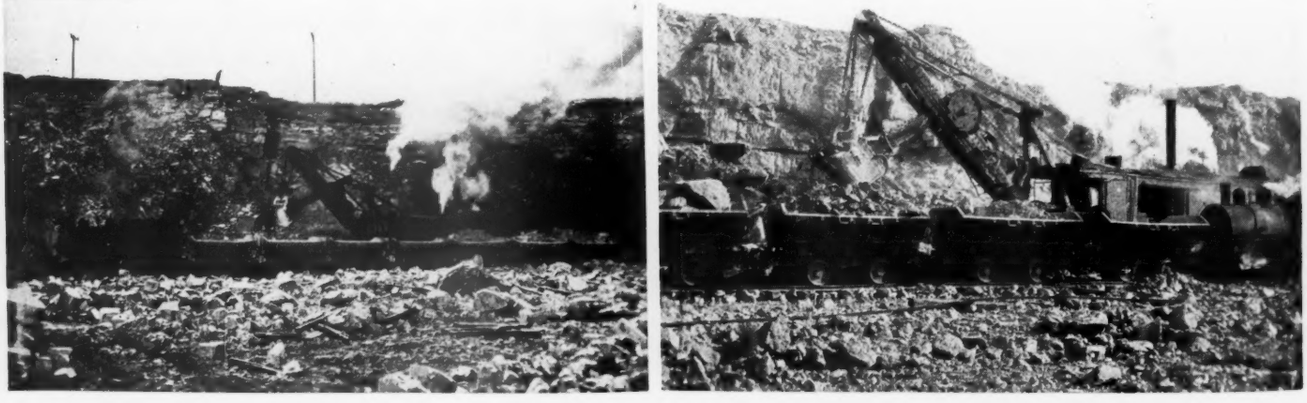
Quarry Loading

At 75% of the quarries under consideration the rock is loaded with steam shovels (they are almost all old operations), but there is evident an increasing tendency toward the use of electric shovels. The steam shovels used range all the way from 60-ton to 110-ton size with 2½-yd. to 5-yd. dippers, but with an average size approximating the familiar 3½-yd. model 91 size. These steam shovels are more than 80% of the crawler type mounting, which has very largely superseded the older railroad type and traction wheel type mountings.

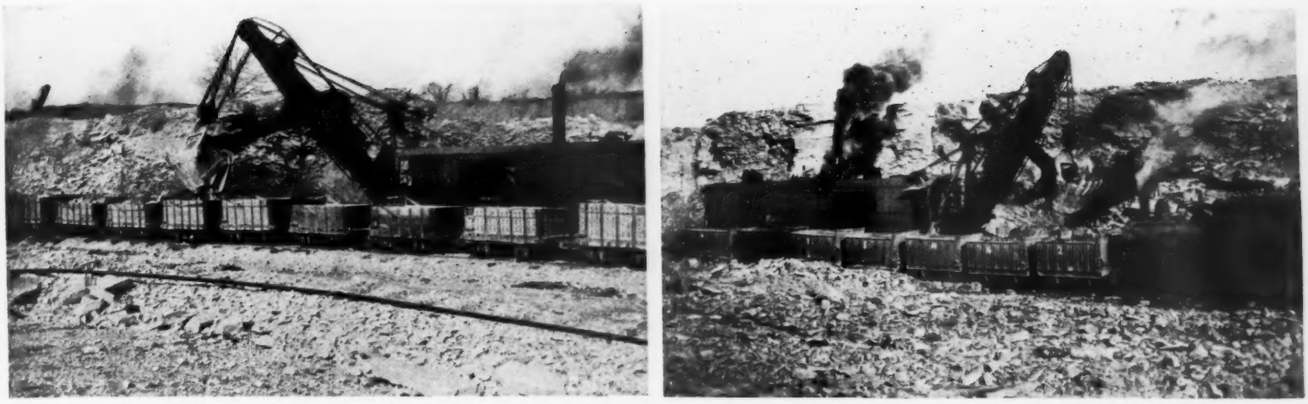
Electric shovels are now in use at seven of these quarries and are of various sizes ranging from 1¼-yd. up to 4½-yd., with an average of about 2¾-yd., and each loading from 60 to 300 tons of rock per hour. They are all of the full revolving crawler-tread type, and because of their convenience and ease of operation and freedom from troubles incident to boiler operation, and their lower operating cost, have been giving good satisfaction. Particularly since the adoption and quite general use of the Ward-Leonard system of control, where a separate generator is used in connection with each of the three motors (hoist, swing and thrust), and where the controllers handle only the small field currents of these generators, maintenance and repairs have become almost a negligible item, and the ease and accuracy of control is all that might be desired.

Quarry Hauling

For transporting the rock to the crushing plant, locomotive-drawn cars of different sizes and types are used at 25 of the 30 plants, or in other words at 83% of the operations. The Woodford system of centrally controlled electric haulage is used at three quarries with cars of 10- and 15-ton



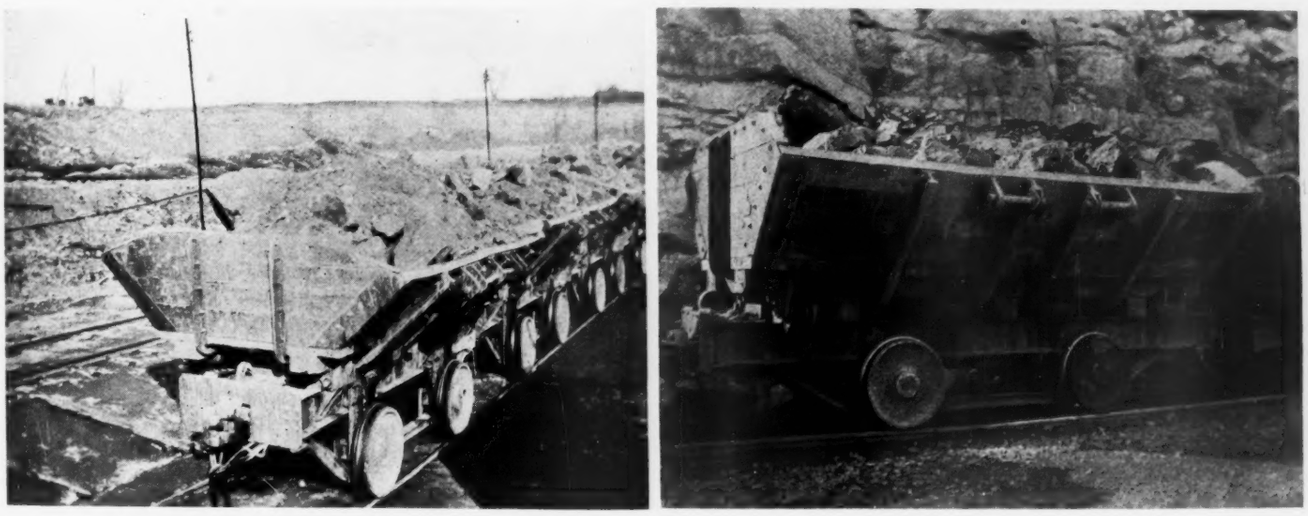
Typical quarry loading operations. Left, a 3 1/2-yd. steam shovel serving 9-yd. modern side-dump cars; right, a 3 1/2-yd. crawler type steam shovel loading to 7-yd. side-dump cars



Some loading operations. Both views show a 3 1/2-yd. steam shovel serving 4-yd. end-dump car at left, and 6-yd. end-dump type at right

capacities, each car being equipped with two 35-hp. motors on the smaller sizes and two 50-hp. motors on the larger sizes. These motors are of the direct-current, series type, and the cars are operated and controlled singly from two or more control towers by means of sectionalized track and third rail. This method of haulage, although not used very generally, has a number of advantages over the more usual car and locomotive method, and where any considerable tonnage is to be handled, is probably more satisfactory and more economical than other methods. These cars are side-dumped by an electrically controlled hoisting arrangement which tilts the body of the car on the frame.

Motor trucks are used at two of the quarries in 3-yd. and 5-yd. sizes and have proven



V-type 9-yd. and 7-yd. modern side-dump cars of wood and steel construction

Varied loading methods. At left, modern 3 1/2-yd. electric shovel and 10-ton electrically-controlled side-dump and a 2 1/4-yd. electric shovel with small side-dump steel cars

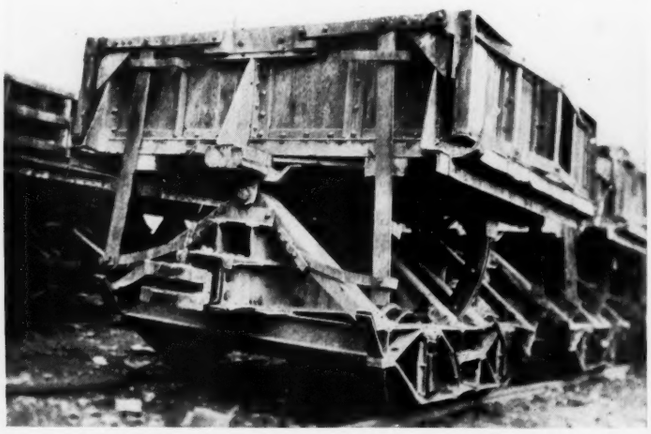
The large crawler-type electric 4 1/2-yd. shovel at left is loading to 6- and 8-yd. cars and the other is a common type used for stripping as well as quarry work

very satisfactory for this work where the haul is not excessive.

Of those quarries in which locomotive-drawn cars are used, fourteen have side-dump cars, while eleven use end-dump cars. The use of the side-dump cars is about equally divided between the V-type rocker steel cars and the Western contractor's type car provided with doors.

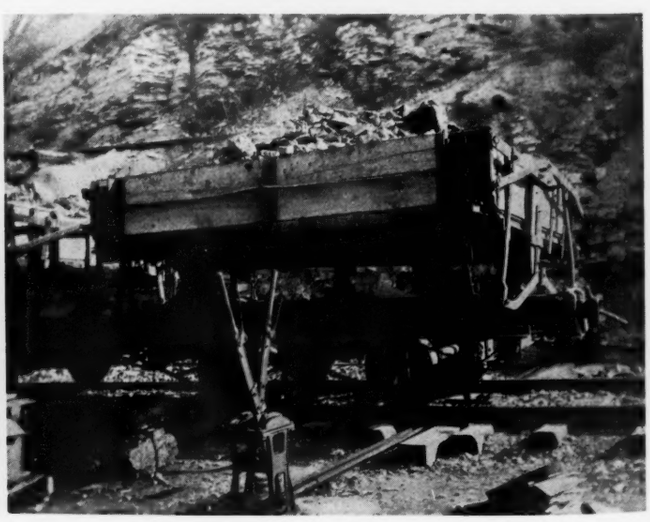
As to why one or the other type is used, there doesn't seem to be any particular reason other than precedent, or individual preference, or expediency (cost or availability of one type as against another), as no very careful study has been made of the com-

A 3-yd. electric shovel loading to 6-yd. end-dump cars

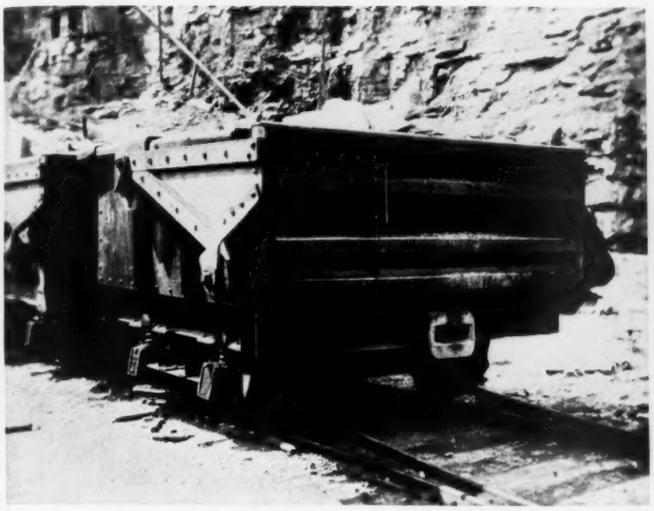


One type of 6-yd. and 8-yd. standard gage side-dump steel car

One method of dumping 12-yd. side-dump quarry cars to the primary crusher



Type of 5-yd. quarry car. In foreground are switch levers for throwing remote switch, a time saver and safety factor



At the left is one type of small end-dump car. The other is an all-steel car centrally controlled through third-rail

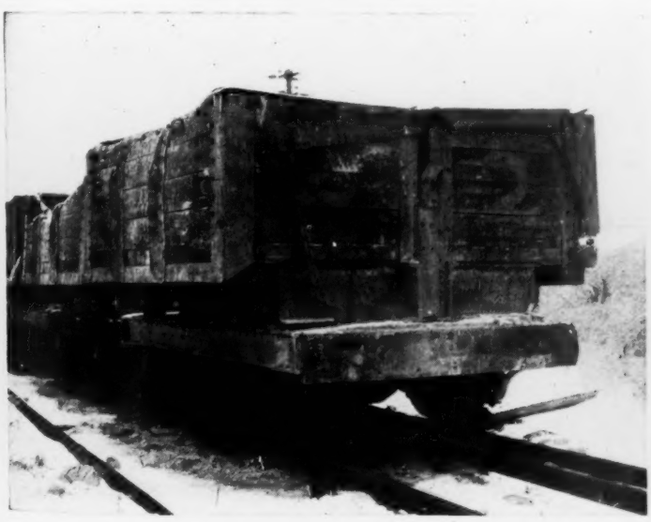
parative economy and efficiency of the different types.

Originally, end-dump cars pulled up an incline and self-dumped by tripping rails at the sides were quite universally used, and are still used where not too much tonnage is required. These are all arranged with an end door hinged at the top and latched at the bottom, which is released at the proper point by the tripping rails. This is of course the simplest arrangement.

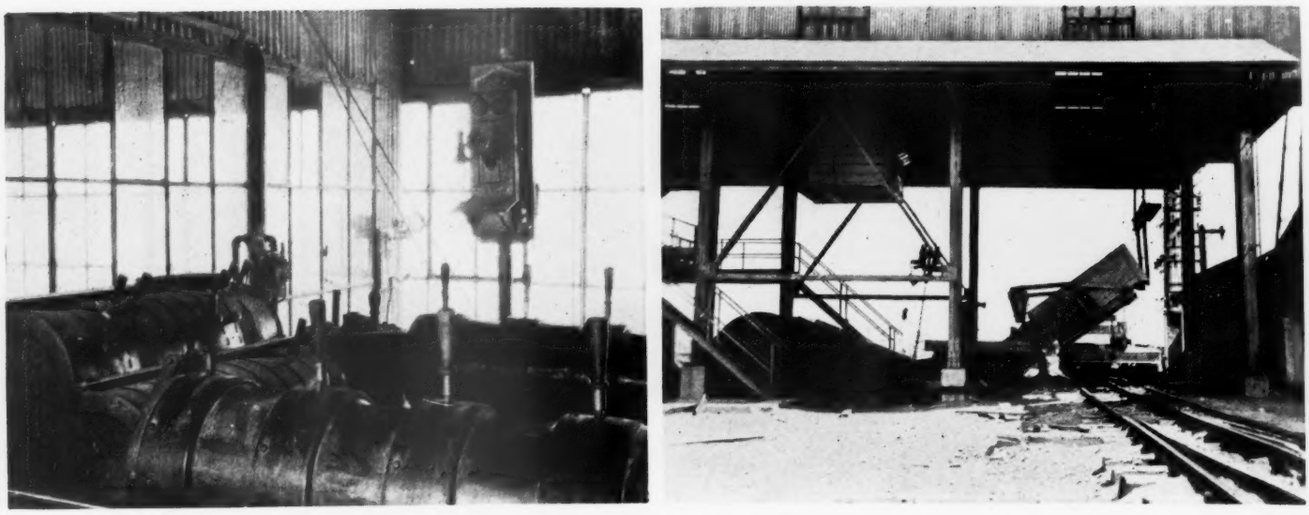
However, as production expanded it was seen that more stone could be put through the plant by using side-dump cars in trains. But this meant doing away with the incline and being able to run the cars past the crusher, for the fullest development of this system. Also by using the side-dump cars with lifting doors a larger door opening was obtained than with the ordinary end-dump cars, which helped to cut down the delays caused by large pieces of stone jamming in the cars. This feature along with larger, wider bodies used on this type of car made it more popular with many operators, and it is now used both on an incline and where the track runs past the crusher.

Control tower from which quarry cars, with motors and third-rail equipment, are operated by means of sectionalized track

The latest development has been the adoption at a number of plants of heavy V-type, rock cars without doors. These have combination wood and steel bodies, as such con-



Combination wood and steel cars used in centrally controlled electric system; these have their own motors controlled through central third rail



Views of modern centrally controlled electric haulage system. Left, inside of control tower; right, dumping a car, with also the traveling crane for hooking any large stone. The operator has complete control of a number of operations

struction has been found more satisfactory in the long run than all-steel construction, partly because of the cushioning effect of the wood, and partly because repairs can be made more easily. So the development has been to the use of rugged side-dump contractor's type cars or V-type rocker cars where the digging is heavy and the pieces of rock are large, or the continued use of the smaller end-dump cars where the stone is well shot down and large tonnages are not required. Eight quarries use V-type cars of from 5-yd. to 9-yd. capacity (mostly 7-yd.) and six quarries use the Western type cars of from 5-yd. to 12-yd. capacity.

End-dump cars of the 4-yd. size are used at seven of the quarries, and of the 6-yd. size at the other four, this being mostly at the older plants, where they are quite satisfactory for the moderate tonnages handled.

For hauling these cars, steam locomotives are used at 20 of the quarries and gasoline locomotives at five. The gasoline locomotives range from 7-ton to 20-ton sizes, while the steam locomotives range from the 15-ton sizes up to 50-tons. About 65% of the steam locomotives are of the 18- and 20-ton sizes, about 25% being 35-ton and over and the balance smaller than 18-ton. They are of various makes, including Porter, Vulcan, Davenport, American and Lima.

Trains all the way from 4 to 12 cars each are hauled, carrying from 30 to 80 tons of rock per train (and averaging about 45 tons per train), depending upon the sizes of cars and locomotives and the trackage.

One thing very noticeable in this connection was that greater train loads are handled so much more easily and with less delay where the tracks are kept smooth and in good condition. Heavy quarry tracks kept properly surfaced are well worth what they cost, and insure moving the maximum tonnage with the least equipment and with a minimum of delay. At about 40% of these quarries standard-gage track is used, and 36-in. gage at the remainder, but good trackage seemed to be a matter of personnel rather than gage.

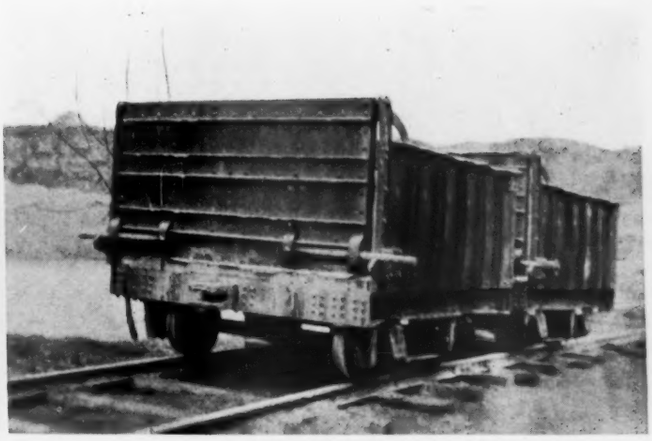
As the transportation cost is normally about 10% of the total cost of production, and may run considerably over that, depending on the condition of the tracks and equipment, this phase of the operation is important as affecting economical production and one that really deserves study and consideration.

A single-track loop system around the quarry is most generally used, with passing tracks where needed, as this arrangement has been found most satisfactory. No attempt was noted to use gravity tracks in simplifying operations, or saving power haulage.

At twenty of the thirty plants the quarry cars are pulled up an incline to the crusher by cable and drum hoist one at a time, and returned empty to the foot of the incline on a track alongside the one containing the

Contrasting two incline installations with double and single track leads

Side-dump, 6- and 8-yd. standard gage type



Standard gage, 6-yd., steel, end-dump car

loaded cars from the shovel. The incline is arranged with a spring switch part way up so that the loads go up from the one track and return to the other, the locomotive leaving a train of loaded cars on the one track and taking away a train of empty cars from the other. At ten of the plants the primary crushers are located at the quarry floor or thereabouts, so that no incline or hoist is necessary.

At one plant an interesting operation is the taking off of the top 6 ft. of limestone overlying the main ledge, which is removed and loaded and shipped without going through the crushing plant, as described in the "Hints and Helps" section of last issue. This top rock, locally known as "sugar stone," since it is used in the sugar beet industry, is thinly stratified and slabby and is easily excavated. A 1-yd. Marion Model 37 steam shovel is used in handling it, in connection with a portable open-end, revolving screen, and a truck.

As illustrative of some of the simple and effective labor-saving arrangements which have been worked out at various plants, at one plant two simple schemes have been used in connection with the quarry transportation, which make the operation easier and which save at least one man. At the foot of the incline, through a system of standard railroad bell cranks and pipes the switch from the main line to the empty siding is connected with an operating lever located so that the car hooker can easily throw the switch. Also, what might almost be termed an automatic coupler is used on the front end of the quarry locomotive. Link-and-pin type couplers are used, and the top hole of the coupler on the locomotive is fitted with a short piece of pipe so that the pin is free to slide up and down in it. A piece of bell cord fastened to the pin is carried over a small pulley above the pipe and into the cab so that the pin may be pulled up or let down. Uncoupling the train of loads at the incline is of course simply a matter of taking the slack and pulling up the pin. Coupling to the train of empties is almost as sure, since the car hooker blocks up the link on the end car with a small piece of stone so that it will enter the coupler on the locomotive.

(To be continued)

Asphalt for Highways and Airports

IN AN ILLUSTRATED 32-page booklet issued by the Asphalt Institute, 801 Second avenue, New York City, information is given on the use of asphalt in pavements and airport runways, with a summary of American design and construction methods, and the developments that have taken place in recent years.

The various types of asphalt construction are covered, such as hot-mix pavements of asphaltic concrete and sheet asphalt, cold-mix pavements with crushed stone and sand, penetration macadam roads with hot asphalt on stone in place, asphalt blocks and surface treatment with road oils.

The utilization and treatment of sandy soils, and the resurfacing of old brick pavements with asphaltic mixtures, is also included.

It is stated that one of the most important developments in construction methods has been the wider use of finishing machines on both sheet and asphaltic concrete, and that improved specifications have done much toward smoother and more durable roads.

Left, typical quarry incline with standard gage track and 6-yd. end-dump steel cars and using an 18-ton gasoline locomotive for quarry transportation; right, 40-ton air-dump steel car for moving crushed stone to storage

The Manufacture of Gypsum Plasters

Part V.—Quality Control of Gypsum and Its Products

By A. M. Turner, E.M.
Denver, Colo.

IN THIS, as well as the foregoing discussions, the subjects have been handled principally from a practical standpoint, rather than by going into theoretical details. Although the quality problems mentioned in the following could be closely interlaced with highly technical data, I deem it unwise to use such a combination, because these articles are written primarily for the interest of the operating personnel of gypsum manufacturers, rather than for the use of the technician. Therefore, little or no space will be given to details of crystallization system, chemical reactions, and similar subjects.

The answer to satisfactory quality control is in uniformity, first, last and always; and it is of such paramount importance that the gypsum plant superintendent cannot stress this feature too strongly.

Raw Material

Quality control starts at the mine or quarry, and in this phase of the operations too careful watch cannot be made in order to assure the desired final products. Each gypsum deposit has an individuality of its own which must be studied and learned in detail in order to assure definite control.

From a chemical standpoint gypsum should be first analyzed to determine its $CaSO_4 \cdot 2H_2O$ content, and the amount and kind of impurities. Definite standards are set for the hydrous calcium sulphate content which is necessary for the products to be made. This figure, of course, establishes a minimum purity for the mined product. However, after the mineral in the entire workings is analyzed it will probably be learned that the average run is far above the minimum requirement. If this is the case, the problem is to ascertain the purity of material which can be most economically reclaimed from the deposit, and to set a definite gypsum content figure toward which to work as a goal in maintaining a uniform material to supply to the mill.

The impurities will generally consist of anhydrite, limestone, sand, soluble salts, organic matter, iron and aluminum oxide, and a small percentage of miscellaneous minerals. The first three impurities mentioned are carried through the flow of manufacture of gypsum products in an unchanged state, and may be considered as inert, with the exception that they have an accelerating effect upon setting time, which may be controlled by the addition of retarder.

Soluble salts usually occur as a white precipitate at the surface of deposits. These minerals at times have decided accelerating effect on stucco, and unless carefully watched are likely to cause wide differences in the setting time of the products. Organic matter has just the opposite effect to the impurities just mentioned and acts as a distinct retarder. Of course it is possible to get an ideal mixture of soluble salts and organic matter so the set will be perfectly normal. However, this condition is more or less a phantasy, and experienced operators will much prefer to have a complete absence of these nuisances.

It may be worth mentioning here that organic material combined with the soluble salts may be the source of discoloration of plastered walls, as well as giving off a disagreeable odor when plaster is mixed with water. One plaster company found it necessary to use a considerable quantity of hydrated lime mixed with their wall plaster in order to hold back the coloring material so it would not stain the finished walls. Whether or not this treatment improved the odor characteristic of the plaster referred to is still an open question.

There is considerable physical variation in gypsum deposits, probably the most important of which are color, crystallization, and texture. In the manufacture of wall plaster, wall board, tile, and similar products the color is not a prime consideration. However, it is most important when considering molding or casting plasters where a white material is demanded. The color of the raw material usually predominates in the finished product, although grinding seems to produce a slight difference. It is doubtful if calcination has any bearing on color. The color can be controlled largely by careful selection of rock from which the products are to be made, although in some deposits the whitest gypsum available is not satisfactory to meet the demand.

Texture and crystallization of gypsum are factors which govern, to a large extent, the kind of equipment most satisfactory to use in the grinding mill. The only way in which this might affect quality is that various methods of grinding do have a marked effect upon consistency of stucco. The texture of some gypsum is such that when large pieces are selected, placed in a Keene's cement kiln, and heated to a temperature of about 1900 deg. F., the rock will remain intact and leave voids through which the heat passes during the process, while other gypsum, under the same treatment, crumbles down and forms a rather compact mass through which the heat does not properly circulate and consequently the desired result is not obtained.

Dryers and Drying

Gypsum coming from the quarry invariably contains free moisture and this percentage of water varies greatly in different deposits as well as in the same deposit and

Editor's Note

IN THIS CONCLUDING article of his series the author stresses the importance of various factors for the control of quality. Above all else he places uniformity at every stage in the preparation and processing of the material.

The editor would also like to take this opportunity to compliment the author on his articles, which incidentally, are his maiden literary effort. And the editor hopes most earnestly that Mr. Turner will write more, later; and that Mr. Turner's example will be followed by other operating men, not only in the gypsum but in other rock products industries.

Particularly would the editor like to see some competent operating man in the Lime Industry come forward with a series of articles like this, of Mr. Turner's. Certainly someone in the lime industry owes it to the industry and to science — engineering and chemistry — to start the ball rolling in a technical discussion of lime manufacture. The failure of men in the lime industry to do this naturally arouses in the minds of scientific men in general grave doubts that anyone in the lime industry has comprehensive, or even adequate, technical knowledge of lime manufacture.

Much that Mr. Turner has said in this, as well as previous articles, would apply with little or slight alteration to lime manufacture. Surely, if uniformity is an objective in gypsum plaster manufacture, it is no less so in lime manufacture. Let's have some practical lime-plant man tell us how uniformity is and can be achieved. Silence on the subject cannot do otherwise than create the suspicion that uniformity is not achieved and knowledge of how to achieve it does not exist in the lime industry. We know that is not true, but where are the technical men in the lime industry to prove it?

at different times of the year. A rotary dryer is generally used to expel this free moisture content when the percentage is high, but in many cases when comparatively dry gypsum is obtained and even at times when the raw material is extremely wet, drying equipment is not employed. The use of a dryer cannot be too strongly recommended as an agent toward producing material which is uniform in quality. The dryer may be easily operated so it will discharge rock which is, for all practical purposes, free from moisture. This material, when uniformly ground and delivered to the kettles, furnishes an ideal material which can be calcined without difficulty, almost perfectly and in accordance with a premeditated system and schedule.

Grinding Practice

As previously stated, the type of grinding equipment is determined by the nature of the mineral to be handled; so account is always carefully taken of the rock to note whether it is soft, brittle, wet or dry. The type of grinding machine does, in turn, have a bearing on the shape of the particles that are made, and this feature has an influence on consistency. It has been found that tube mills have a tendency to discharge flat particles which, when examined in bulk, assume a flour-like appearance. Such material requires a large amount of water to be mixed with it in order to make a workable mixture, or as commonly expressed, it has a high consistency. A product of this nature is a particularly desirable one from which to make cement plaster.

However, if a low consistency material is desired, such as molding or casting plaster, a different type of grinding than that just mentioned would be required. Regardless of what type of grinding apparatus is used, the most important consideration from a standpoint of quality is to establish the fineness of the gypsum which it is most desirable to use, and then exert every effort to maintain the standard grind with as little variation as possible.

Theoretically, if too large particles of gypsum are added to the kettle to be calcined, there is a tendency for the outside of the pieces of gypsum to be thoroughly calcined, while the center would go through the entire cooking cycle without being dehydrated. On the other hand, there is a possibility that the very fine material in the kettle will be over calcined and reduced to artificial anhydrite. Since this theory is largely true in practice, it serves as a guide for grinding limits. That is, where stucco is to be reground, the raw material is usually ground as coarse as possible without producing particles which will not calcine to the center, and the amount of super-fine material should be kept at a minimum.

Calcination Practice

If uniform conditions are met, as mentioned in the aforesaid description, there will be delivered to the kettles a raw material which is uniformly mixed and of a constant composition, with free moisture eliminated, and of a uniform grind. This is most essential as the kettle is a poor receptacle for correction; since this unit in itself meets so many other demands which are necessary for a high standard product, it is only fair that it should be fed with a definite uniform product. Untold difficulty will arise in the manufacture of plaster board, tile, and all other products if stucco from which they are made varies to any appreciable extent.

A little variation in the grind, set, or consistency of stucco does not appear to amount to much on the face of it, but when the fact is considered that an abrupt change in the stucco grind of the material used for the manufacture of plaster board causes variation, directly or indirectly, in the feed to the mixer, the amount of water required, the accelerator used, the time of set, the consistency, the width of board, board weight, the drying temperature, and various other factors, the seriousness of the subject begins to be apparent. Therefore, I again want to stress the importance of uniformity, and hope that it will stand foremost in the mind of every plaster manufacturer until he practices it conscientiously in every department over which he has control.

The time required to fill a kettle should be as nearly constant as possible, and the shorter the time the better, as the ideal condition would be for all the gypsum in every batch to be cooked exactly the same length of time. Theoretically, this result should be accomplished more nearly perfectly by the use of rotary calciners. Needless to say, the kettle temperature should be the same from batch to batch, the total time of calcination constant, and the temperature at which the kettle is dumped always the same. Usually stucco is removed from the hot pits at regular intervals, but in some instances the last batch cooked during the day remains in the hot pit until the following morning, or maybe the last material dumped at the end of the week remains in the pits until operations begin the following week. I do not say that stucco is necessarily damaged by remaining in the hot pits for a period of time, but without question when it remains in place it undergoes certain changes, and for this reason a definite plan should be followed for removing stucco from the cooling bins at regular intervals, thus conforming to the general practice of uniformity. Sometimes storage conditions and practices are such that some stucco is used immediately after it is made, while other material may remain in bins for months before it is put into a finished product. Stucco characteristics change with age and for this reason fresh material, if treated in the same way as stucco which has aged, will not produce a product with the same qualities.

Setting Time

The time of set of stucco is usually tested immediately after the kettle contents are dumped into the hot pit. Should the raw material, grind, and calcination method always be the same, the stucco, if tested under similar conditions, would be constant. The rate of recrystallization of the hemihydrate is varied greatly by difference in kind and amount of impurities associated with gypsum, and variation in calcination method. A variation in setting time of stucco is a direct symptom indicating that the path of uniformity has not been followed along the line, and action should be got under way immediately to locate the source of the trouble. Various methods are used for determining the time at which the stucco may be considered set. The method used is not very important as long as the same method is used consistently. It is from a comparison of results that valuable information is obtained.

It is well worth while to observe the fact in laboratory testing work that cleanliness and uniformity go hand in hand toward accomplishing dependable results.

Consistency

As every plaster mill operator knows, consistency of stucco is a term which indicates the amount of water required to mix with the calcined gypsum in order to produce a mass which has definite working qualities that comply with some set standard. In other words, a high consistency stucco would mean calcined gypsum which required a large amount of water mixed with it to make a mixture that conformed with a standard, and a low consistency material would require less water. The raw gypsum and the impurities it carries have much to do with the water carrying capacity of the cooked product. This condition, however, must necessarily be accepted as nature has provided, and treated accordingly. The next important controlling factor is the grind of the rock. The finer the grind, the higher the consistency material made, and the variation in water-carrying capacity is almost in direct proportion to the grind. Calcination also has an important effect on this characteristic for the reason that there is a variation in the amount of gypsum which is reduced to anhydrite in each batch. The greater the amount of anhydrite the lower will be the consistency of the material produced. The relation of grind to consistency applies to regrind as well as the raw grind of the gypsum. As described in the second installment of this series of articles, the water carrying capacity of stucco can be artificially lowered by at least two different methods.

Regrinding

As previously described, the type of grinding equipment is largely dependent on the kind of product which is desired. The choice of machinery in this unit of the operation is usually a choice between tube mill or Buhr stones. The tube mill, as before stated, produces a flour-like product with a high consistency, which is particularly desirable for cement plaster. However,

if the cement plaster is not the main requirement, in all probability the most suitable process would be the use of the Buhr stones.

If the center of some of the gypsum particles coming to the second grinding unit are not completely calcined to the center, the raw material will be liberated and crushed into many small parts which will have a marked accelerating effect on the setting time. At times the hydroscopic moisture condenses in the hot pits, conveyors or elevators and is the means of setting some of the stucco. These set particles, when ground finely, naturally serve to hasten the set. Another condition which causes more rapid crystallization is aëration. If the stucco, in its route from the hot pits to the storage bins, is allowed to fall freely through air of a rather high humidity, sufficient moisture will be taken up to increase distinctly the setting time of the reground stucco. The foregoing suggestions may be the means of the plaster factory operator locating some of the difficulties he has experienced.

Accelerators

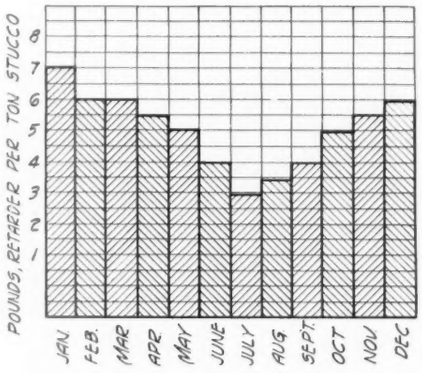
Numerous gypsum products require the addition of an accelerator in order to obtain the required setting time. In the first place it is absolutely necessary, if uniform results are to be obtained, that the set of the stucco being used is uniform. The accelerator added to the material may be ground gypsum, potassium sulphate, aluminum sulphate or various other materials. Of course accurate and equal weights should be added to each batch mixed, regardless of the kind of accelerator used. However, this is not all that is necessary to assure constant results. A most important consideration is to make sure that the material added to the stucco has a uniform grind, and that it is mixed with the stucco intimately. If the above regulations are observed there should be little difficulty obtaining material with a uniform setting time.

Retardation

The first consideration in regard to retardation is the nature of the retarder being used. Its strength may vary greatly, which naturally would cause considerable variation in the weight of that material which will be required in each batch. It is usual to find that when a retarder is stored for a short time it takes on water due to rehydration of the lime it contains. The result of this action is that a unit weight of the ingredient is not as efficient as it was before it had taken on weight.

Another effect of age in the retarder is the formation of lumps. This feature is not injurious if the retarder is crushed and screened before adding to the stucco. If this precaution is not observed and the lumps go into the plaster, serious results follow. Retarder lumps in plaster show up in plastered walls as white and yellow streaks. The yellow color is from the concentrated retarder itself, and the white places are caused by the plaster, in spots, not setting, but instead drying out.

I am especially familiar with one instance where a plaster contractor on a large job secured a sack of retarder from the plaster manufacturing mill so he could regulate the setting time of the plaster on the job to suit himself. The sack of retarder he secured had not been screened, and the plasterers on the job neglected to screen it before mixing the material with the plaster. Since this retarder had been in storage for several months, it contained many lumps which naturally became mixed with the plaster, with the result that the finished walls, after drying, were a mass of yellow and white spots and streaks. Since the plaster contractor naturally would not admit that he had not screened the retarder, the blame for the damage was shifted to the manufacturer, who, in order to hold the remainder



Typical seasonal retarder curve

of the business on the job, paid for having the dried out spots dug out of the wall, the resulting holes patched and the walls painted.

Assuming that all conditions were uniform through the process of manufacture up to the point of mixing, the amount of retarder used would be a constant for a required set, but for one exception. This exception is dependent upon the season of the year, and from the accompanying chart an illustration may be seen of how the amount of retarder per ton of stucco varies throughout the different seasons of the year for the same setting time of plaster. Beginning with January it may be seen that the maximum amount of material is needed to hold back the setting time, but from that time until July the amount of retarder necessary for a standard set becomes less. Then, after mid-summer as the season again approaches winter the retarder amount rises correspondingly.

Gypsite plaster has, in a general way, the same seasonal differences regarding the setting time as gypsum plaster, but ordinarily requires about a third less retarder than the rock plaster. On the other hand, if eternal vigilance is not observed in regulating the mixture of raw material at the deposit, it may become necessary to vary the retarder between 1 and 10 lb. to the ton of stucco at any time of year, and it is also not uncommon for a wide variation in setting time to occur in successive batches of stucco made from earthy gypsum.

Needless to say, it is imperative that the weights of stucco and retarder to be mixed together should be consistently accurate, and the time of mix be sufficient so that the entire charge is uniform.

Fibers

From a standpoint of quality the fiber which is mixed with stucco has a less important bearing than the other factors that have been discussed. It may be borne in mind that if fiber is to be mixed with plaster, care should be taken to see that a rather large amount of hair, sisal, or both is used, as too small an amount of this binding material has little more value than if none at all was used. Fiber which is shorter than an inch in length is of little use and that longer than 5 in. is likely to form knots which cause trouble in various ways. Of course the hair and sisal should be intimately mixed with stucco, and care taken to avoid bunching.

An interesting complaint occurred a few years ago in the West, when white spots appeared throughout a plastered wall. When digging into the soft white places it was found that under each one was a little piece of hide. The hide of course had come from the cattle or goat hair which had been used, and was broken into small bits by the picker. These small pieces being organic in nature had such a strong retarding effect that they caused the plaster in their close proximity to dry out, thus resulting in the white spots.

General Quality Notes

When there is a limited number of mixers in a mixing department it naturally becomes necessary to use the same machine for various products. Different methods are employed for cleaning out mixers prior to putting some other product through the equipment. If, for instance, an accelerated material is to be run immediately following retarded plaster, investigation will prove that it is very difficult to eliminate all the retarder in the mixer, so that it will not affect the faster setting product. Possibly the most satisfactory means of cleaning a mixer is to alternately brush out the chamber and blow it out with an air hose. If this is repeated several times and then a clean out charge put through the equipment comparatively good results may be expected. Of course it is desirable to have individual mixers and sacking equipment for every product when possible.

There is constantly an accumulation of material to reclaim in any mixing and shipping department. This material can usually be used by mixing in small quantities with other material, but it should

only be remixed in definite proportions as determined after obtaining the results of tests made on a trial charge or by laboratory experiment.

An old time gypsum mill executive cites an instance where a complaint arose because the plaster began to pop or chip off in small bits from the wall. After investigating the situation, the fact was learned that stucco had been shipped in bulk to a mixing plant where sanded plaster was made. The bulk stucco was carried in cars which previously contained grain. Some of the grain that was hidden away in the cars became mixed with the stucco and ultimately was contained in the plaster on walls. The grain seeds took on water, swelled and caused pops in the plaster.

Conclusions

If plaster and other gypsum products are made to meet even roughly the most common quality requirements, there are practically no complaints which come from the job where the material is used that can justly be blamed on the manufacturer. Gypsum plaster will age and become short working if kept in storage too long. Since this is a recognized fact, it must be faced and made the best of. The best precaution against this difficulty is proper distribution, which is materially aided by mixed-car shipments. If plaster is made with a setting time suitable for one season of the year, but the material is not used until a different season, trouble may arise. The condition cannot well be compensated, but it can hardly be considered a serious problem. Unreasonable conditions or failure to observe the proper specifications often result in sweatouts or dryouts, but this again is a condition that cannot be controlled by the manufacturing mill.

This article, with few exceptions, has dealt with gypsum as a basis for the products discussed. The reason is that gypsite has so many variable characteristics that it cannot be handled or discussed according to fixed rules. In the first place the composition of gypsite is so variable that its fineness will fluctuate between 65% and 90% through a 100-mesh sieve; the gypsum content often varies from 65% to 92%, and the retarder necessary to add to stucco made from earthy gypsum may be anywhere from 0 to 14 lb. to the ton. However, the principles set forth to be followed in the manufacture of gypsum products serve well as goals to shoot at when handling gypsite. Gypsite plaster has the fact in its favor that it will stand aging without noticeably deterioriating, and will also stand considerable abuse without serious effects.

Again I wish to repeat that the one most important general principle to follow in order to secure dependable quality results is *uniformity* in all phases of the gypsum manufacturing cycle.

Gold in Gravel Beds?

With the Suggestion That the Government Help Sand and Gravel Producers Recover It

By H. N. Kirk
H. N. Kirk and Co., Keene, N. H.

AT THE PRESENT TIME we have an overproduction and lack of demand for many of the common metals; copper, iron, aluminum, etc. Prices are in some cases at a non-profit level.

The one metal that is not affected by depression in business is gold. The value per ounce remains the same under all conditions that we find in the United States; in peace, war or business depression. But instead of a steady gain of gold production per capita here in the United States it has fallen off, and our demand for a higher standard of living has mounted and is mounting to a still higher level. This can mean only one thing. Our gold per capita should be increased.

Every means that the United States government can put into use should be used to encourage and foster the increase of gold production. The government should give aid by experimental work to those gravel and sand producers who recover their gravel and sand from river beds or wash their gravel and sand from other sources for a possible gold value contained therein before placing the gravel on the market for concrete construction. The government should analyze free all such gravel beds for a possible gold value per cubic yard and give such reports to the operating companies. Also the government should co-operate with the gravel producers to see if a gold value of 10 c. or more per cubic yard can be saved.

As much gravel and sand is handled by dredges and washed, it would seem that ways or means could be perfected to save these values that must exist in some cases in the production of washed gravel and sand for concrete construction, particularly on the West Coast and in the Rocky Mountain section.

Gold dredges are making a profit working gravel running only a small value per cubic yard in some localities where power is cheap and no use is made of the gravel or sand.

While this article deals with the need of more gold it should arouse the interest of those gravel and sand companies which operate on river gravel or other gravels from other sources on a large scale.

The United States government should help in every way possible in the increased production of gold and the above points the way to one possible means of increasing this amount of gold per capita.

Any labor saving device or method that could be perfected would never produce an overproduction, but would be a step toward making the trend of gold production upward instead of downward.

We have all kinds of technical skill and capital idle because what is the use of increasing the supply of copper, etc., on such a market as exists today? This engineering ability and financial co-operation can be utilized to profitable advantage in producing more gold.

The increased production of gold is one of the great factors that will make it possible for the laboring man in the mining field to obtain work in the gold production field of labor. This curtailment of copper production would help to raise the price to a profit level. It would shift labor from an overproducing or lack of demand field to a new field of labor where it would be impossible for an overproduction. If the United States government fails to take action as to an increased production of gold here in the United States it is doing a wrong to every man, woman and child within its borders.

If there are gold values in the washed gravel and sand that goes into our concrete construction it should be saved even though the profit is small. It will give work to labor and you will find that labor is willing to work and also a good spender. Good spenders make the wheels of industry hum.

A large amount of gold worth $20 per ounce costing us $19.99 to produce would be a godsend to the United States because it would put millions of dollars into the hands of labor who are good spenders and it would circulate fast.

There is an old saying, "He has money to burn." How true it is, some misers here in the United States will find it so especially if it goes with them when they cease to be.

We do not need more shoe factories, woolen mills, cotton mills, machine shops, etc. What we need is more gold per capita individually held so that the factories we have can run on full time.

Idle capital should seek new sources of gold and when it has increased the labor in the gold field and is actually producing many more millions of gold per year than the United States now is, you will find your factories all humming and a demand for a slow, healthy increase in new factories or replacements.

Lack of demand kills business. With an increase per capita of gold individually held there can be no lack of demand because individually held capital is spent and put into circulation over and over again.

Dusting of Portland Cement Clinker

By Katsuzo Koyanagi
Chichibu Cement Co., Tokyo, Japan

EVERYONE who holds a post in a portland cement factory knows the mysterious phenomenon known as "dusting" of cement clinker. The origin of this phenomenon has been studied by many people, but W. Dyckerhoff[1] was the only one who elucidated it theoretically. According to his opinion, there are three modifications, α, β and γ of dicalcium silicate. The transition from α to β—modification occurs at 1420 deg. C., and that of β to γ at 675 deg. C. In the transition from β to γ there accompanies a volume expansion of about 10%, and this transition with volume expansion gives rise to the well-known phenomenon, "dusting" of clinker.

We have carried out in our laboratory some experiments on this problem, which we will report below.

I—Original Experiments

During the burning in our test kiln we obtained some pieces of clinker, which broke down in cooling and parted into three parts shown in Fig. 1. In Fig. 1, part I was the dark black colored hard mass of clinker, part II was at first a dark brown colored hard mass, breaking down in a short time into very fine grey powder. Part III was a porous mass of light yellow color with some black spots.

The analyses of the clinker burnt in the kiln at that time and above three parts of the dust clinker are shown in Table 1. The fine powder of part II contained many small particles of part I and part III, so we separated it with a sieve of 4900 meshes to the sq. cm., and used the part which passed through the sieve as the sample of analysis.

We see from these analyses that something high in silica, perhaps flint stone in this case, has accidentally come into the raw mixture, been covered by it and sintered. The inner parts are higher in silica and lower in lime content. The dusting occurred at certain range of chemical composition, which is higher in silica and lower in lime than the original clinker.

TABLE 1—ANALYSES OF TEST CLINKER PARTS

	Original clinker	Dusting clinker I	Dusting clinker O II	Dusting clinker III
Ig. loss	0.20	0.06	0.26	0.02
SiO_2	21.63	21.53	32.78	34.80
Al_2O_3	6.27	6.63	4.14	1.13
Fe_2O_3	2.72	3.70	1.25	5.50
CaO	68.00	67.30	61.71	58.85
MgO	1.74	1.60	1.04	0.81
Hyd. mod.	2.22	2.11	1.62	1.42
Sil. mod.	2.41	2.08	6.08	5.05
$\frac{Al_2O_3}{Fe_2O_3}$	2.31	1.79	3.30	0.21

O=The part where dusting occurred.

We made some slices out of the original clinker and part I of the dusting clinker at *a-b* section. We found the original clinker very rich in Alit, in part I only a little Alit

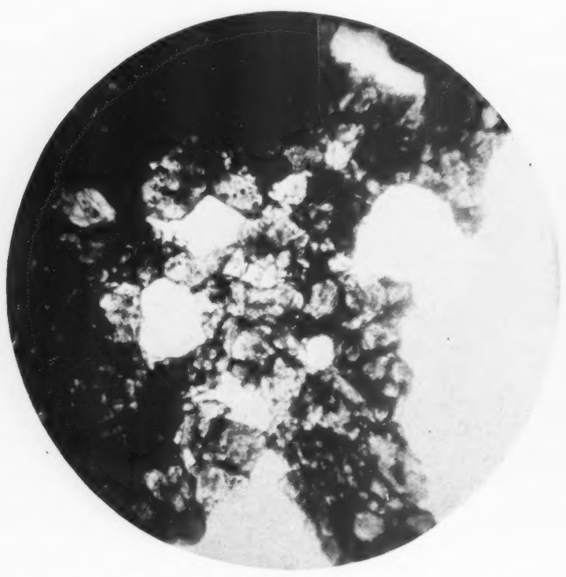


Fig. 2. Some colorless transparent crystals of Alit clinging to surface of (a) side in Part I

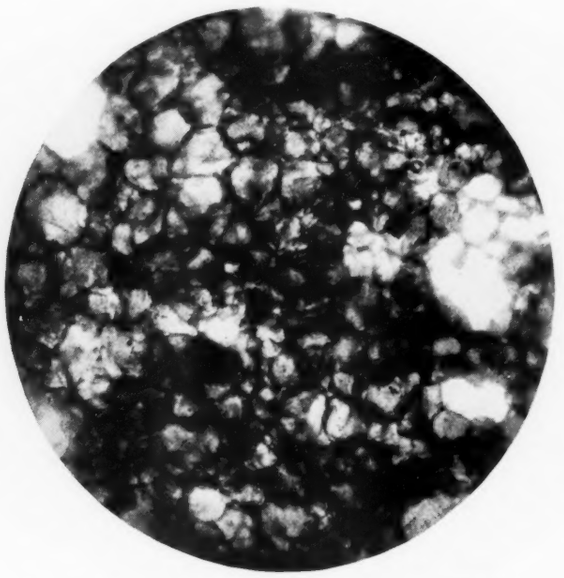


Fig. 3. Inner portion of Part I consists completely of yellow-colored Belit

[1]W. Dyckerhoff; *Zement*, 1924, *No. 39*, p. 468.

clinging to the outside surface (Fig. 2); and no Alit and only Belit in the inner part of it (Fig. 3). This shows that the surface of the part I is of the same chemical composition as the original clinker, and inner part of it is lower in lime ratio.

II—Another Series of Experiments

In order to ascertain the connection between the silica, lime and sesquioxide contents of dusting clinker, we carried out further some experiments. We made at first mixtures of $CaO \cdot SiO_2$, $2CaO \cdot SiO_2$ and $3CaO \cdot SiO_2$ by using the pure reagents of calcium carbonate and silica bought from Kahlbaum, Berlin, melted in oxyacetylene flame. We obtained melts of $CaO \cdot SiO_2$ and $3CaO \cdot SiO_2$ by ordinary cooling, but the melt of $2CaO \cdot SiO_2$ broke down into fine white powder when it dropped into the crucible. The chemical composition of above silicates are as follows:

	$CaO \cdot SiO_2$	$2CaO \cdot SiO_2$	$3CaO \cdot SiO_2$
SiO_2	....51.82%	35.08%	26.39%
CaO	....48.18%	64.92%	73.61%

On the other hand we took two kinds of cement raw meal as shown in Table 2.

TABLE 2—ANALYSES OF RAW MEAL AND CLINKER

	No. 1		No. 2	
	Raw meal	Clinker	Raw meal	Clinker
Ig. loss	36.13	0	34.94	0
SiO_2	14.10	22.08	11.82	18.17
Al_2O_3	4.39	6.87	5.00	7.69
Fe_2O_3	1.36	2.13	4.06	6.24
CaO	43.55	68.18	43.27	66.51
MgO	0.99	1.55	0.96	1.48
Hyd.mod.	2.19	2.19	2.07	2.07
Sil.mod.	2.45	2.45	1.30	1.30
$\frac{Al_2O_3}{Fe_2O_3}$	3.23	3.23	1.23	1.23

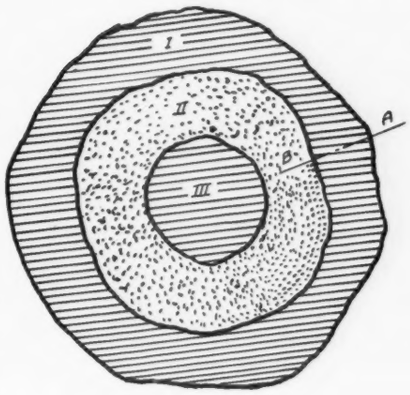


Fig. 1

Raw meal No. 1 is high in silica, low in sesquioxide, while No. 2 is on the contrary low in silica and high in sesquioxide.

We next added to the raw meal fine powdered pure silica, shale, "dinas" brick and "schamotte" brick of such chemical composition as shown in Table 3, mixed with water which contained some boiled starch and made into a thick paste. We kneaded the paste on a glass plate with a knife thoroughly, and made some rods out of it. After complete drying we melted the rods in an oxyacetylene flame, let it drop into a carborundum crucible, which was previously heated to about 800 deg. C., and cooled it slowly down to room temperature.

We made thus six series of melted clinker, and observed the points where dusting occurs. The chemical compositions of these melted clinkers are given in Tables 4 to 9.

When we exclude magnesia from the chemical composition of the melted clinkers

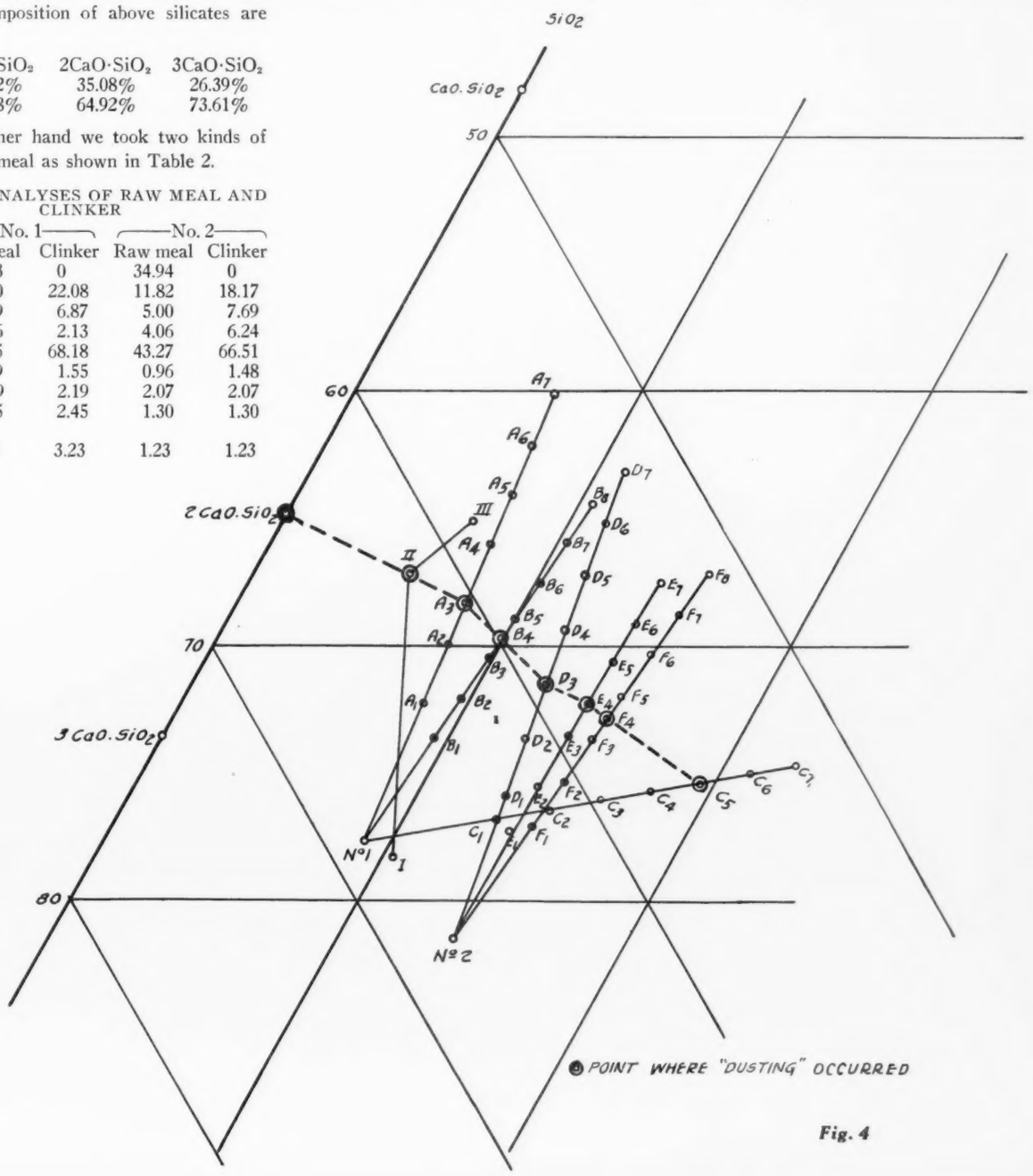


Fig. 4

TABLE 3—ANALYSES OF MATERIALS ADDED TO THE RAW MEAL

Sign of material	a (Pure silica)	b (Shale)	c ("Dinas" brick)	d ("Schamotte" brick)
Ig. loss	8.83	9.29	0.06	0.0
SiO_2	91.17	72.26	77.27	34.87
Al_2O_3	.....	12.23	19.41	58.36
Fe_2O_3	.....	1.27	1.82	6.09
CaO	.....	1.86	0.52	0.57
MgO	.....	0.83	0.33	0.38

shown in foregoing tables, and calculate the remainder, i.e., SiO_2, R_2O_3 and CaO in per cent., and put them into a triangle diagram of ternary system, so we obtain Fig. 4.

In Fig. 4 the double circles are the points where dusting occurred. When we connect these points with lines, it forms nearly a straight line through the point of $2CaO \cdot SiO_2$, about perpendicular to the side line of triangle.

In the same manner when the chemical composition of the three parts of the dusting clinker shown in the first chapter is calculated and put into the diagram, we obtain points I, II and III. The point II, where dusting occurred, comes nearly on the straight line connecting other dusting points.

Now we select again the points where dusting occurred and put their chemical compositions into a table, Table 10.

We see from this table that the range of chemical composition in which dusting occurs can be fairly great. When the clinker contains no sesquioxide, it reaches the highest value of lime and silica content, that is in the case of $2CaO \cdot SiO_2$, and contents of lime and silica are 64.92% CaO and 35.08% SiO_2. As commercial clinker contains always more or less sesquioxide, it never attains the highest value of lime and silica. When the sesquioxide content becomes higher, then the contents in lime and silica become lower, and it takes a longer time for the clinker to begin dusting. This comes from the fact that in this case the content in dicalcium silicate, which takes a principal part in dusting, decreases and moreover the sesquioxide reacts as binding matter and prevents the clinker from sudden dusting.

Conclusions

The dusting of portland cement clinker can occur in fairly great range of chemical composition, but the contents of lime and silica of it can never be higher than 64.92% CaO, or 35.08% SiO_2. The higher the content of sesquioxide, the lower the lime and silica contents, and longer time it takes to begin dusting.

From this it is possible to think that, in an operating cement kiln, dusting can more often occur when high silica brick is used as lining in the sintering zone than when high aluminous brick is used.

TABLE 4—CHEMICAL COMPOSITION OF MELTED CLINKER FREE FROM IGNITION LOSS

(Raw meal No. 1 + material a)

Sign of clinker	A_1	A_2	A_3 (O)	A_4	A_5	A_6	A_7
SiO_2	27.51	29.66	31.33	33.77	35.78	37.76	39.70
Al_2O_3	6.39	6.21	6.02	5.84	5.67	5.49	5.32
Fe_2O_3	1.98	1.92	1.87	1.81	1.76	1.70	1.65
CaO	63.41	61.62	59.75	57.96	56.20	54.47	52.76
MgO	1.44	1.40	1.35	1.32	1.28	1.24	1.20

O=Point where dusting occurred.

TABLE 5—CHEMICAL COMPOSITION OF MELTED CLINKER FREE FROM IGNITION LOSS

(Raw meal No. 1 + material b)

Sign of clinker	B_1	B_2	B_3	B_4 (O)	B_5	B_6	B_7	B_8
SiO_2	26.03	27.63	29.17	29.93	30.68	32.02	33.62	35.06
Al_2O_3	7.32	7.51	7.69	7.77	7.86	8.03	8.20	8.36
Fe_2O_3	2.08	2.06	2.04	2.03	2.02	2.00	1.98	1.96
CaO	63.48	61.79	60.05	59.17	58.31	56.61	54.93	53.29
Mgo	1.50	1.49	1.47	1.46	1.46	1.44	1.42	1.40

O=Point where dusting occurred.

TABLE 6—CHEMICAL COMPOSITION OF MELTED CLINKERS

(Raw meal No. 1 + material d)

Sign of clinker	C_1	C_2	C_3	C_4	C_5 (O)	C_6	C_7
SiO_2	23.06	23.44	23.79	24.16	24.50	24.85	25.18
Al_2O_3	10.72	12.30	13.77	15.23	16.64	18.01	19.38
Fe_2O_3	2.43	2.55	2.66	2.77	2.88	2.99	3.09
CaO	63.03	61.05	59.12	57.22	55.36	53.56	51.78
MgO	1.46	1.43	1.39	1.36	1.33	1.30	1.27

O=Point where dusting occurred.

TABLE 7—CHEMICAL COMPOSITION OF MELTED CLINKERS

(Raw meal No. 2 + material a)

Sign of clinker	D_1	D_2	D_3 (O)	D_4	D_5	D_6	D_7
SiO_2	23.79	25.97	28.15	30.25	32.48	34.41	36.42
Al_2O_3	7.16	6.95	6.75	6.55	6.36	6.16	5.96
Fe_2O_3	5.81	5.65	5.48	5.32	5.16	5.00	4.84
CaO	61.94	60.17	58.42	56.69	54.98	53.29	51.62
MgO	1.37	1.34	1.30	1.26	1.22	1.18	1.14

O=Point where dusting occurred.

TABLE 8—CHEMICAL COMPOSITION OF MELTED CLINKERS

(Raw meal No. 2 + material b)

Sign of clinker	E_1	E_2	E_3	E_4 (O)	E_5	E_6	E_7
SiO_2	22.33	24.01	25.62	27.21	28.90	30.31	31.84
Al_2O_3	7.79	8.09	8.39	8.54	8.68	8.81	8.97
Fe_2O_3	5.90	5.78	5.66	5.53	5.41	5.28	5.17
CaO	62.00	60.39	58.71	57.04	55.39	53.78	52.19
MgO	1.44	1.42	1.41	1.39	1.38	1.37	1.31

O=Point where dusting occurred.

TABLE 9—CHEMICAL COMPOSITION OF MELTED CLINKERS

(Raw meal No. 2 + material c)

Sign of clinker	F_1	F_2	F_3	F_4 (O)	F_5	F_6	F_7	F_8
SiO_2	22.58	24.30	25.97	26.78	27.61	29.25	30.78	32.32
Al_2O_3	8.56	8.91	9.23	9.40	9.56	9.88	10.17	10.51
Fe_2O_3	5.91	5.78	5.66	5.60	5.54	5.41	5.29	5.18
CaO	61.58	59.66	57.82	56.88	55.98	54.14	52.43	50.71
MgO	1.39	1.36	1.33	1.31	1.29	1.26	1.23	1.20

O=Point where dusting occurred.

TABLE 10—CHEMICAL COMPOSITIONS OF DUSTING CLINKERS

Sign of clinker	$2CaO \cdot SiO_2$	II	A_3	B_4	D_3	E_4	F_4	C_5
SiO_2	35.08	32.78	31.33	29.93	28.15	27.21	26.78	24.50
Al_2O_3	.....	4.14	6.02	7.77	6.75	8.54	9.40	16.64
Fe_2O_3	.....	1.25	1.87	2.03	5.48	5.53	5.60	2.88
CaO	64.92	61.71	59.75	59.17	58.42	57.04	56.88	55.36
MgO	.....	1.04	1.35	1.46	1.30	1.39	1.31	1.33
Time when dusting began		At once	After about 20 min.	40 min.	1 hr.	2 hr.	4 hr.	24 hr.	3 days

German Cement Merger

THE Portland Cement Works of Heidelberg, Mannheim & Stuttgart, A. G., has completed an agreement with the Silesian Portland Cement Industry A. G., involving a community of interest between the two concerns through an exchange of 25% of their capital stock.

The Silesian Cement Industry A. G. has completed a further community of interest with the Saxon-Thuringian Portland Cement Works and the Pruessing & Adler German Portland Cement Works, thus evolving a major cement trust along national lines.

Cement Mill Dust and Vegetation*

STATEMENTS APPEAR occasionally in regions around cement mills indicating a fear that dust from kiln stacks may have harmful effects on vegetation in the vicinity.

Sometimes the fact that a plant is located in a poor agricultural district leads to the mistaken inference that the mill has brought about this condition; on the other hand, many plants are located in the midst of unusually productive agricultural areas. Much of the fear that dust from a cement mill may be harmful probably comes from a lack of understanding as to what this dust is and in what quantities it is ordinarily given off.

In the process of cement manufacture, calcareous and argillaceous materials, commonly limestone and clay, are finely ground and mixed in the proportions required as a raw material for the kilns. The limestone predominates heavily in the mixture, which varies according to the analysis of the rock.

When introduced into the kiln a very small proportion of this finely-divided raw material is blown into the stack before it reaches the calcining zone in the kiln. In the stack its progress toward open air is deterred, usually by means of electrical or other equipment, so that only a very meager proportion of the originally small amount of stack dust is actually liberated into the surrounding atmosphere.

Investigations have shown that most of this dust falls within short radius, leaving only the impalpable powder to float greater distances through the air. While containing an infinitesimal volume, these particles are quite visible in the air, just as in the case of tobacco smoke.

Analysis of Crusher Dust

An inspection of the analysis of dust collected around crusher houses and stack bases is interesting. It apparently contains little, if any, finished cement. The principal constituents found are calcium oxide, carbon dioxide, silica and lesser quantities of the oxides of iron, aluminum and magnesium. In an exhaustive investigation of dusts undertaken a few years ago by the United States Public Health Service the following analysis was found in the case of dust collected in a cement mill crusher department:

	Per cent.
Silica (SiO_2)	15.70
Iron and aluminium oxides	6.20
Lime (calcium oxide)	41.93
Magnesium oxide	2.64
Carbon dioxide, water and other organic matter	33.45
Total	99.92

*Communication from A. J. R. Curtis of the Portland Cement Association in answer to inquiries for general information on this subject.

The most interesting deductions concerning the above analysis are made after comparing it with the following analysis of a good agricultural lime fertilizer, supplied by the National Fertilizer Association as typical of a class:

		Per cent.
Silica (SiO_2)		7.41
Aluminum oxide	1.91	2.89
Iron oxide	0.98	
Magnesium oxide		18.17
Lime (calcium oxide)		28.29
Other oxides		1.20
Carbon dioxide	41.57	42.14
Water	0.57	
Total		100.10

While no two samples of either the dust or the fertilizer would yield the identical analysis except by chance, the above analyses are believed to be quite typical; samples of dust taken at a short distance from the mill might show relatively less silica, if, as commonly supposed, the latter constitutes the larger and heavier of the stack particles.

It is noted that in a high grade commercial lime fertilizer the combined calcium and magnesium oxides run 46.46% of the total, while in the stack dust the percentage of these valuable fertilizing elements totals 44.57%, practically as high carbon dioxide and water total 42.14% in the commercial limestone and 33.45% in the stack dust. While the two analyses above vary considerably in silica content, the possible excess of silica in the dust is mechanically advantageous to the soil and could have no harmful effect on vegetation, as this substance is entirely inert.

Cement Mill Dust Valuable as Fertilizer

These analyses should indicate quite clearly the valuable nature of cement mill dust as fertilizer; in fact, if there is any difference in availability as between the ordinary commercial limestone product and the mill dust, the advantage is with the latter, which is more finely divided, while the former is usually applied in coarser and therefore less readily available form. It will be remembered that systematic liming of the soil is advantageous for all field crops and is generally resorted to at great expense.

The question occasionally arises as to the possibly harmful effect of accumulations of dust on the leaves of various plants. A practical answer may be obtained by examining corn or other crops growing so near stone roads as to become very dusty. Such plants are invariably as strong and flourishing as similar vegetation comparably located back from the road. The technical reason is that the plants are unaffected by accumulations on the upper surfaces of the leaves, which serve the purpose of shields which protect the stomata, or breathing cells, located on the under surfaces.

As to the possibility of cement dust reacting with moisture on the surface of leaves and in that way causing mechanical injury to the plant, Prof. R. Ewert, a German chemist, who has made the only exhaustive report on the subject that we know of, states that his experiments in the vicinity of several German cement mills disproved the theory entirely. Professor Ewert's experiments in artificially treating various garden plants with cement dust, in an experimental plant in Upper Silesia, Germany, are interesting. The dusting of the plants was performed so frequently that all newly formed leaves were covered. He says of his experiments in 1916 and 1917:

Experiments Disprove Harmful Effects

"The plants treated by cement dust, and other kinds of dust, in 1916, without exception, brought the highest harvest results; on the average the same held true in 1917. Only cucumbers treated with limestone dust, for some unknown reason, were prematurely ripe, while the cucumbers near an operating cement factory were sound, although they were exposed to equally as strong a dust mantle."

After a series of experiments extending over several years, Professor Ewert summarizes his findings as follows:

1. The cement or lime dust hinders to a certain extent the complete admission of the sunlight and thus under normal conditions retards the assimilation process of the leaves to some extent, but, its favorable influence upon the harvest results, weighs heavily on its credit side. On the other hand it assists the plant to weather draught periods, through its covering the cuticulu of the epidermis cells and preventing too strong perspiration.

2. The pores upon plants with slit openings on the top side of the leaves are not plugged by the dust.

3. An unfavorable influence upon the fruitification of the flowers from cement dust and lime dust could not be proven, even the wind loving plant corn did not give any indication of disturbance to the fruitification.

4. The cement and lime dusts protect our cultivated plants from pests and parasite fungi to a considerable degree.

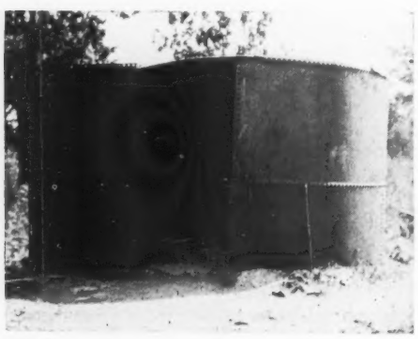
5. Owing to the lime, the dusts escaping from the cement factory benefit the soil and the useful bacteria.

6. From the above it can be seen that the influence of the cement and lime dusts is generally more beneficial than harmful, which is also indicated by the average results from the experiments.

Hints and Helps for Superintendents

Old Water Tank Makes Good Quarry Shelter

AN OLD WATER TANK turned upside down and with part of the side cut loose and hinged makes an excellent



Old water tank provides shelter from quarry blasting

protection against quarry blasting and also a convenient place to keep quarry tools, as indicated in the accompanying picture.

Spring Switch for Quarry Inclines

THE ACCOMPANYING PHOTOGRAPH shows a type of spring switch different from that commonly used for automatically returning the empty cars to the empty track on quarry inclines.

At most quarries where the loaded cars are drawn up one at a time on one track and returned empty to the other track a plain spring switch is used, but where the hoisting load is balanced, the loaded car going up while the empty goes down and the loaded cars coming up alternately on first one track and then the other, a different scheme is necessary for automatically throwing the switch.

One way in which this is accomplished is by a toggle arrangement with a coiled spring as indicated, so constructed and adjusted that the spring holds the switch points in one position until the toggle is thrown over the center in the opposite direction. The car wheels of the car coming up the incline throw the switch points and toggle so that the car will return on the same track, then the next car coming up on the other track automatically throws the switch for return on that track, and so on, the switch position being thus reversed each time a car comes up the incline.

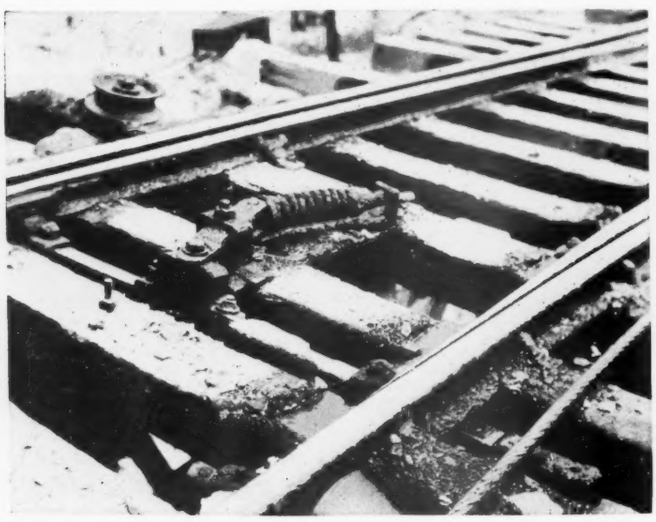
Truck Loading Sand Bunkers Arranged for Winter Heating

A GOOD WAY to make easier the winter loading and hauling of sand is shown in the accompanying photograph, which shows two sand bunkers used at the sand and gravel plant of the J. L. Shiely Co., St. Paul, Minn.

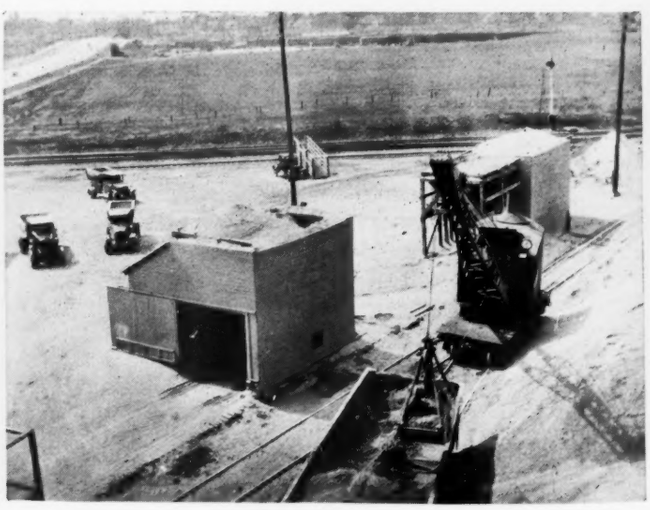
These were originally built without housing, but in order to break up the frozen lumps in the stock pile during cold weather operations the bunkers were housed and steam coils put in. The steam for heating is supplied from the locomotive crane used in loading them. This scheme has proved very effective in breaking up the frozen chunks and keeping the sand warm and dry for winter deliveries.

Car Pulling by "Remote Control"

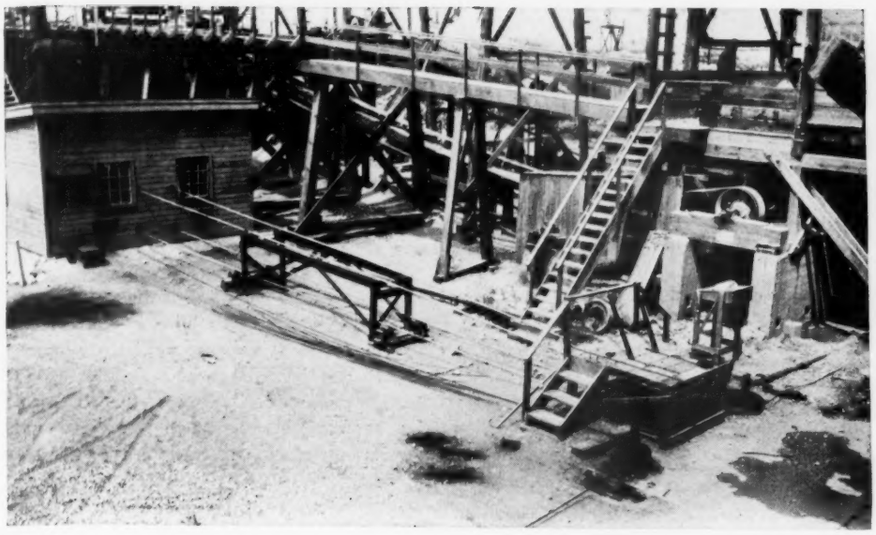
PLACING A CAR PULLER directly beside a sand or stone plant, down in the dirt and wet, is certain to affect its operation, and moreover it is usually decidedly in the way. The Northern Gravel Co. has got around these difficulties at its plant at Barton, Wis., by placing its car puller in a shed about 25 ft. away from the railroad track and operating the puller by "remote control." A stand a couple of feet high was built beside the track for the operator and two levers were installed here for the operation. Then these levers were connected in a straight line to the drum levers or the puller by means of small-sized galvanized pipe, the pipe passing through holes in the side of the shed to reach the original levers on the



Unusual type of spring switch used for returning empty cars to track on quarry inclines



Arrangement of sand bunkers which makes winter loading and hauling easier



The car puller at this Wisconsin gravel plant is operated by "remote control"

drums. The connection was made with bolts to allow free action as the lever is moved forward or backward. To support the pipe in its 25-ft. span a sort of a rack or table was installed, as shown in the illustration, and the rods slide on this.

The cables from the drums are also run through holes in the side of the building and out to pulley wheels anchored at the ground beside the operator's stand, from which point they are run to the cars.

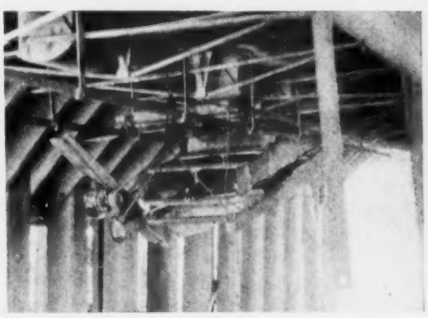
The stand is also equipped with a small desk on which the operator keeps a record of the cars as they are filled and moved.

Rinsing Aggregate at the Loading Spouts

WHILE THE IDEA of rinsing gravel or crushed stone aggregates at the loading spout is not new, the three illustrations show how three operations in the Midwest took care of this operation. One view (No. 1) shows how the American Aggregates Corp. at its Indianapolis, Ind., plant

No. 1. Water is sprayed on a screen as the gravel flows over it

No. 2. Another view showing how gravel is washed while being loaded



No. 3. Vibrating screen mounted under bins can be moved from bin to bin over a suspended track

washes gravel while loading. The second view was taken at the plant of the State Sand and Gravel Co., also of Indianapolis. In both cases water is sprayed on to a screen as the gravel flows over it.

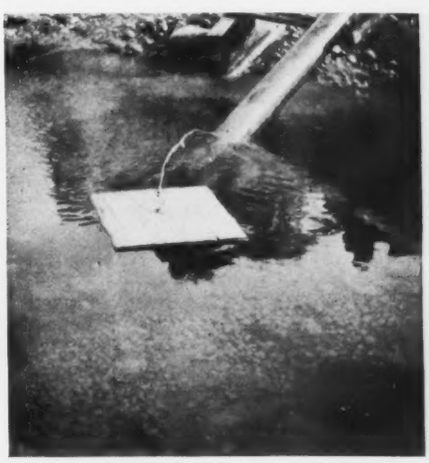
The Zenith Limestone Co., Tulsa, Okla. (the third view) has an unusual method of loading aggregate, so as to give the material a fine screening as it passes from the bin to the cars.

The screening device referred to consists of a Universal vibrating screen and motor-drive unit, all suspended under the bins on two parallel bar rails. The screen is hung from these rails by small wheels so the screen can be moved from bin to bin as desired. The oversize falls to the carrier being loaded (motor trucks or gondola railway cars) and the fines are bypassed to the ground through a short chute.

The plant is located near the banks of the Arkansas river, but washing cannot be practiced, as the muddy waters cannot be discharged to the river, so dry screening must be practiced.

To Prevent a Centrifugal Pump from Pumping Air

WHEN THE WATER in the pool or sump in which a centrifugal pump is operating gets so low that the pump intake is only a few inches below the surface, the pump will naturally begin to suck air down from the surface. This action is readily recognizable by the little swirl or whirlpool in the water just above the intake. If left to continue the air pump increases in volume and the efficiency of the pump is reduced to a marked extent. To prevent this a small float can be held in position directly over the intake which prevents the air from passing down through the water to the pipe. Even if a small swirl forms beside the float



Float above the pump intake prevents the sucking of air from the surface

it does not last because the float moving about on the surface soon breaks it up.

The float should be at least 14 in. square and can be made by cleating two or more 1-in. boards together. To hold it in position a stiff wire is used, wrapped around the intake pipe. This holds the float directly over the intake, but permits sufficient movement to allow for the change of water level.

The 1929 Census of Lime Manufactures

THE BUREAU OF THE CENSUS announces that, according to data collected in the census of manufactures taken in 1930, the total shipments or deliveries (at f.o.b. factory prices) of lime in 1929 by manufacturers in the United States engaged primarily in the production of this commodity were valued at $29,639,880, a decrease of 18.2% as compared with $36,222,321 reported for 1927, the last preceding census year. The total for 1929 is made up as follows: Quicklime, 1,940,123 tons, valued at $15,899,410; hydrated lime, 1,399,085 tons, $11,267,952; agricultural lime, 748,872 tons, $2,472,518.

The statistics for 1929, with comparative figures for 1927, are given in the following tables. The figures for 1929 are preliminary and subject to revision. They are based on actual returns from manufacturers who contributed the greater part of the total value of products reported at the last preceding census, on returns from manufacturers who reported for the first time at the census for 1929, and on estimates for a few establishments which reported at the census for 1927 but for which returns for 1929 have not yet been received.*

TABLE 1—SUMMARY FOR THE INDUSTRY: 1929 AND 1927

	1929	1927	Per cent. of increase (+) or decrease (—)
Number of establishments	239	260	— 8.1
Wage earners (average for the year)†	9,747	10,903	—10.6
Wages‡	$10,791,393	$12,190,918	—11.5
Cost of materials, containers for products, fuel and purchased electric current‡	15,236,474	17,269,467	—11.8
Products, total value‡	36,638,428	41,587,458	—11.9
Lime	$29,639,880	$36,222,321	—18.2
Other products	$ 6,998,548	$ 5,365,137	+30.4
Value added by manufacture§	21,401,954	24,317,991	—12.0

†Not including salaried employes. The average number of wage earners is based on the numbers reported for the several months of the year. This average somewhat exceeds the number that would have been required for the work performed if all had been continuously employed throughout the year, because of the fact that manufacturers report the numbers employed on or about the 15th day of each month, as shown by the pay rolls, usually taking no account of the possibility that some or all of the wage earners may have been on part time or for some other reason may not actually have worked the entire week. Thus in some cases the number reported for a given month exceeds the average for that month.

‡Manufacturers' profits cannot be calculated from the census figures because no data are collected for certain expense items, such as interest on investment, rent, depreciation, taxes, insurance and advertising.

§Value of products less cost of materials, containers for products, fuel and purchased electric current.

TABLE 2—LIME—PRODUCTION, BY KIND, QUANTITY AND VALUE: 1929 AND 1927

	1929	1927
Lime made in all industries, total value	†	$37,094,495
Made in the lime industry, value	$29,639,880	$36,222,321
Made as a secondary product in other intries, value	†	$ 872,174
Quicklime:		
Tons	1,940,123	2,334,377
Value	$15,899,410	$21,403,714
Hydrated lime:		
Tons	1,399,085	1,471,654
Value	$11,267,952	$14,152,292
Agricultural lime:		
Tons	748,872	317,382
Value	$ 2,472,518	$ 1,538,489

†Not yet available. Complete figures will be given in the final report.

*As the purpose of this preliminary report is to make the census statistics available at the earliest possible date, thus insuring their maximum current value, they have been compiled from returns which have not received the careful scrutiny and revision which will be given them before the publication of the final reports, and are based in small part on estimates for those establishments which have not yet made their returns. For these reasons, some of the items in this report may differ appreciably from the corresponding items in the final report for the industry, but it is believed that these differences are not of sufficient importance to have any material effect on the value of the statistics for practical purposes.

Northwest Contractors Form Co-operative Buying Association

ARTICLES of incorporation have been filed with the secretary of state by officials of the Northwest Machinery Co., an organization of northwestern contractors which has as its purpose the purchase of machinery and other supplies used by its member firms.

A. C. Tracy has been named manager of the corporation which has established itself at 710 Front street, Boise, Idaho. Officers of the firm are W. C. Dewey, C. C. Cowley, Harold Quinn, Paul Brooks, A. G. Holland, W. J. Smith and others. The company will not only supply equipment, but will be engaged in construction work.

Capital stock of the company amounts to $100,000, with sufficient subscriptions in the hands of the company's treasurer to give it a working capital. Contractors associated in the company are the Idaho Contracting Co.; Ryberg, McHugh and Cowley Construction Co.; Service Tire and Vulcanizing Co.; Triangle Construction Co. and other Idaho and Washington contractors.—*Boise* (Ida.) *News*.

Steel Corporation's Limestone Holdings in Indiana Reported Sold

SOME 11 YEARS ago the Illinois Steel Co. (subsidiary of the United States Steel Corp.) secured an option on several hundred acres of land adjoining Stinesville (Ind.) on the west and spent two years drilling for stone. Later on the company selected 800 acres which it bought outright.

It is now reported on good authority that these holdings have been purchased by the Indiana Limestone Co. The activity of the limestone company in that field is believed to be only a forerunner of the opening of new quarries there. This would indicate that Stinesville is again about to come into its own. It is recognized by all stone men that the finest grade of Indiana stone comes from the Stinesville field. Stone from this district was used to build the sailors' and soldiers' monument and the state house at Indianapolis years ago.—*Bloomington* (Ind.) *World*.

Vermont Lime Producers Extend Sales Territory

UNDER THE CAPTION "Vermont Lime Invades the Ohio Territory," the *Sidney* (N. Y.) *Enterprise* carries the following interesting if not entirely accurate story:

"From the time when this country entered the 'Cement Age,' the territory east of the Hudson river has been claimed and owned by the Ohio association of lime producers, and while their prices have gradually been getting lower, it was not until the Vermont crowd, wanting to extend their field of operation, entered this section, that the price has been put at its present low level. And this low price has become effective with the leasing of the G. A. Clark factory buildings in this village by C. H. Fuller, of Unadilla, who is the general agent of the Vermont makers of lime.

"The distinguishing feature of the two kinds of lime is in the manner of manufacture, the Vermont brand being wood burned, while the Ohio lime is manufactured with the aid of bituminous coal.

"During the past few weeks, Mr. Fuller has had a force of men at work on the Clark buildings, strengthening the foundations, and one of the buildings is being extended so that all building materials may be loaded direct from cars on the Clark railroad siding, into the building.

"The C. H. Fuller Co. is in control of all the territory west of the Hudson river for the Vermont lime manufacturers, but his especial territory at present will be New Jersey, Pennsylvania and New York west of the Hudson. He will have his headquarters in New York City, the local retail store and distributing station being in charge of his son-in-law, Everett E. Ashe, a graduate of Rochester College and recently in the employ of the New York Telephone Co., who has leased a home in this village and will soon bring his family to Sidney to make their home.

"The C. H. Fuller Co. will handle all kinds of building material, except lumber and its allied products, in fact everything which enters the foundations of buildings. The workmen are hustling work on the buildings on the Clark property, with the expectation that Mr. Fuller will be ready to supply his customers from the Sidney headquarters within about fifteen days. The business will be conducted on a cash basis, the customer delivering his cash and driving away with the desired goods."

James S. Van Middlesworth

THE Lawrence Portland Cement Co., New York City, announces the death of James S. Van Middlesworth, on November 14. Mr. Van Middlesworth was for many years secretary of the company and one of its directors.

Editorial Comment

OUR PLATFORM

¶ Greater Economy of Production; the Best in Machinery, Control Equipment; High Wages; Perfect Co-ordination. ¶ Comprehensive Organization of Industry for Research, Promotion. ¶ Retirement of the State from Competition with Private Business. ¶ Active Participation of Business Men in the Business of Government. ¶ The Promotion of Safety and Welfare of the Industry's Employes.

Chemistry in Cement Manufacture

A prominent portland cement manufacturer remarked the other day that portland cement manufacture was 90% mechanical and 10% chemical, and that this was a view commonly held by cement company executives. If that's the case we think the viewpoint of the executives is somewhat warped, and that sooner or later the cement industry will suffer because of it. We think that any viewpoint which does not give chemistry a 50-50 break with mechanical engineering as the fundamental science underlying cement manufacture is a mistaken one.

True, that most of the developments in cement manufacture have been in the way of equipment and not in processing. The tendency in particular, of course, has been toward larger and larger machines and finer and finer grinding—and it is true that grinding is what takes the power and the investment and the time, consequently attracting the most attention and perhaps too frequently the most technical talent.

But fine grinding, at both ends of the process, after all, is a mere refinement and does not concern the crucial part of the process, except as a refinement. Moreover, the cement industry has no monopoly of technical talent and experience when it comes to fine grinding, because it is an incidental part of many manufacturing processes.

The only part of cement manufacture that is peculiar to it is the proportioning of certain mineral materials and the passing of these, after adequate preparation, through a chemical process requiring large quantities of heat. Fine grinding the raw materials presumably facilitates the chemical reaction with heat, and fine grinding the product presumably makes it more quickly available for the final chemical reaction with water.

But the finer the grinding the greater the loss in efficiency if the materials are not accurately proportioned for the desired chemical reaction. What real good does it do to fine grind the raw materials and the product if the chemical functioning of the kiln is only 25 to 50% efficient? The finer grinding of the product will make what cement there is more readily available, but it will not increase the amount of cement; and the cement, whatever it may be, is made in the kiln.

It matters little whether the expert cement operator starts with a technical foundation of mechanical engineering or chemistry. He must eventually become a high-grade chemical engineer, for in this industry the two sciences are too closely linked to be separated. Too great a bias in either direction will prevent the comprehensive viewpoint necessary to settle the problem of what is the best cement and why. To our own mind the answer lies with the chemist, the physical chemist, who will have an exhaustive knowledge of mineralogical chemistry as well as a routine knowledge of cement making.

Research in Cements

The portland cement, lime and gypsum industries need more men like Harry E. Brookby, whose untimely death we have recorded elsewhere in this issue. Perhaps he would not be ranked high as a scientist by other scientists who have done much in pure research, because he had a strong commercial instinct and sought specific knowledge because it was personally profitable for him to find it, if possible. Moreover, he did not know *too much* about chemistry or physics. He did not necessarily reject theories because they appeared unsound, or did not jibe with our present accepted knowledge.

These industries often fail to appreciate that there are two distinct functions of scientific research. One is to develop scientific truths, or knowledge, both for the maker and the user of the product. The research bureaus of the federal and state governments and of the associations are examples. The other function of research is to develop and use knowledge for a specific and profitable objective.

For example, scientific research develops the water-cement ratio (theory and fact) and its relation to the strength of concrete. The users—the concrete manufacturers (or contractors)—have applied it by getting along with less water with the same cements as previously. The cement manufacturer, so far as we know, hasn't made as much use of this piece of scientific knowledge as he might, for he hasn't tried to make a cement requiring less water to make a workable concrete.

Brookby, realizing the application of the water ratio to all cements, and desiring to improve the strength of gypsum and lime mortars, quite naturally studied water-gypsum and water-lime ratios. Having proved the influence of water ratios, he set about changing the nature of the lime or gypsum so that it would not require such an excess of water for workability, which in specific instances he did successfully.

But it is not the particular line of research that this man followed that we wish to emphasize. It is the need of following up fact-finding with product-making. It requires a rare type of individual because he must have not only a large fund of scientific knowledge, a research type of mind, but a strong grasp of business and of practicalities.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[20]	11-18-30	94	.....	
Alpha P. C. new com.	11-15-30	17¼	18	50c qu. Oct. 25
Alpha P. C. pfd.[2]	11-15-30	118	.....	1.75 qu. Mar. 15
American Aggregates com.	11-18-30	12	14	75c qu.Mar. 1
Am. Aggr. 6's, bonds	11-18-30	No market		
American Brick Co., sand-lime brick	10- 6-30	4½	.....	25c qu. Feb. 1
American Brick Co. pfd.	11-17-30	57	.....	50c qu. May 1
Am. L. & S. 1st 7's[20]	11-18-30	96	.....	
American Silica Corp. 6½'s[49]	11-18-30	No market		
Arundel Corp. new com.	11-18-30	37⅞	38	75c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	11-18-30	No market		
Beaver P. C. 1st 7's[20]	11-14-30	94	97	
Bessemer L. & C. Class A[4]	11-14-30	25	29	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	11-14-30	90	93	
Bloomington Limestone 6's[39]	11-18-30	52	56	
Boston S. & G. new com.[47]	11-14-30	15	18	40c qu. Oct. 1
Boston S. & G. new 7% pfd.[47]	11-14-30	45	50	87½c qu. Oct. 1
California Art Tile A	10-31-30	.....	8	43¾c qu. Mar. 31
California Art Tile B[5]	11-14-30	2	.....	20c qu. Mar. 31
Calaveras Cement com.	10-31-30	.....	12	
Calaveras Cement 7% pfd.	10-31-30	.....	85	1.75 qu. Oct. 15
Canada Cement com.	11-17-30	14	15	
Canada Cement pfd.	11-17-30	90½	91	1.62½ qu. Sept. 30
Canada Cement 5½'s[43]	11-14-30	99¼	100	
Canada Cr. St. Corp. bonds[43]	11-14-30	94¼	97	
Certainteed Prod. com.	11-17-30	3½	3⅝	
Certainteed Prod. pfd.	11-17-30	15	19	1.75 qu. Jan. 1
Cleveland Quarries	11-17-30	63	65	75c qu. 25c ex. Dec. 1
Columbia S. & G. pfd.	11-17-30	82	89	
Consol. Cement 1st 6½'s, A	11-18-30	70	75	
Consol. Cement. 6½% notes	11-18-30	55	60	
Consol. Cement pfd.[29]	11-18-30	.....	35	
Consol. Oka S. & C. 6½'s[12] (Canada)	11-15-30	99	101	
Consol. Rock Prod. com.[9]	11-13-30	1	2	
Consol. Rock Prod. pfd.[9]	11-13-30	9	11	43¾c qu. June 1
Consol. Rock Prod. units	11-10-30	10	13	
Consol. S. & G. pfd. (Can.)[48]	11-14-30	78¼	80	1.75 qu. Nov. 15
Construction Mat. com.	11-17-30	9	10½	
Construction Mat. pfd.	11-17-30	33	35½	87½c qu. Nov. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	11-15-30	87	93	
Coosa P. C. 1st 6's[29]	10-21-30	50	55	
Coplay Cem. Mfg. 1st 6's[40]	11-15-30	95	.....	
Coplay Cem. Mfg. com.[40]	11-15-30	10	.....	
Coplay Cem. Mfg. pfd.[40]	11-15-30	60	.....	
Dewey P. C. 6's (1930)[30]	11-18-30	98	.....	
Dewey P. C. 6's (1931-37)[30]	11-18-30	98	.....	
Dolese & Shepard	11-17-30	.....	66	$2 qu. Oct. 1
Dufferin Pav. & Cr. Stone com.	11-17-30	.....	13	
Dufferin Pav. & Cr. Stone pfd.	11-17-30	80	83	1.75 qu. Oct. 1
Edison P. C. com.[39]	11-14-30	50c	.....	
Edison P. C. pfd.[39]	11-14-30	2½	.....	
Giant P. C. com.[2]	11-15-30	5	15	
Giant P. C. pfd.[2]	11-15-30	15	30	1.75 s.-a. June 16
Gyp. Lime & Alabastine, Ltd.	11-17-30	13¼	13½	37½c qu. Oct. 1
Gyp. Lime & Alab., Ltd., pfd.	11-17-30	.....	15	
Hermitage Cement com.[11]	11-15-30	30	35	
Hermitage Cement pfd.[11]	11-15-30	86	90	
Ideal Cement, new com.	11-17-30	48	50	75c qu. Oct. 1
Ideal Cement 5's, 1943[33]	11-15-30	100	101	
Indiana Limestone units[20]	11-18-30	.....	80	
Indiana Limestone 6's	11-17-30	55	58	
International Cem. com.	11-17-30	59½	60	$1 qu. Sept. 30
International Cem. bonds 5's	11-17-30	97¼	98¼	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	11- 1-30	90	93	
Kelley Is. L. & T. new stock	11-17-30	35	40	62½c qu. Oct. 1
Ky. Cons. St. com. V.T.C.[48]	11-13-30	8½	10	
Ky. Cons. Stone 6½'s[48]	11-13-30	90	100	
Ky. Cons. Stone pfd.[48]	11-13-30	85	90	1.75 qu. Nov. 1
Ky. Cons. Stone com.[48]	11-13-30	8½	10	
Ky. Rock Asphalt com.[11]	11-15-30	9	11	40c qu. Oct. 1
Ky. Rock Asphalt pfd.[11]	11-15-30	75	80	1.75 qu. Sept. 1
Ky. Rock Asphalt 6½'s[11]	11-15-30	90	100	
Lawrence P. C.[2]	11-15-30	51	61	$1 qu. Sept. 30
Lawrence P. C. 5½'s, 1942[2]	11-15-30	86	88½	
Lehigh P. C.	11-17-30	16½	19½	25c qu. Nov. 1
Lehigh P. C. pfd.	11-17-30	99	100	1¾% qu. Jan. 2, 1931
Louisville Cement[48]	11-14-30	225	250	
Lyman-Richey 1st 6's, 1932[13]	11-15-30	97	99	
Lyman-Richey 1st 6's, 1935[13]	11-15-30	97	99	
Marblehead Lime 6's[14]	11-14-30	85	90	
Marbelite Corp. com. (cement products)	11-14-30	125	.....	
Marbelite Corp. pfd.	9-20-30	12	.....	50c qu. Oct. 10
Material Service Corp.	11-18-30	15½	18	50c qu. Dec. 1
McCrady-Rogers 7% pfd.[22]	11-13-30	50	51	
McCrady-Rogers com.[22]	11-13-30	15	20	
Medusa Portland Cement	11-17-30	.....	90	1.50 Oct. 1
Mich. L. & C. com.[6]	11-15-30	25	.....	
Missouri P. C.	11-17-30	27½	28	50c qu. & 50c ex. Nov. 1
Monolith Portland Midwest[9]	11-13-30	2½	3	
Monolith bonds, 6's[9]	11-13-30	80	85	
Monolith P. C. com.[9]	11-13-30	4½	5½	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	11-13-30	3½	4½	40c s.-a. Jan. 1
Monolith P. C. units[9]	11-13-30	12½	14	
National Cem. (Can.) 1st 7's[43]	11-14-30	99½	101	
National Gypsum A com.	11-17-30	4¼	5¼	
National Gypsum pfd.	11-17-30	23	26	
Nazareth Cement com.[26]	11- 3-30	17	.....	
Nazareth Cement pfd.[26]	11- 3-30	97	.....	
Newaygo P. C. 1st 6½'s[29]	11-18-30	100½	.....	
New Eng. Lime 1st 6's[14]	11-14-30	50	60	
N. Y. Trap Rock 1st 6's	11-17-30	100½	.....	
N. Y. Trap Rock 7% pfd.[36]	10-24-30	95	.....	1.75 qu. Oct. 1
North Amer. Cem. 1st 6½'s	11-17-30	54½	.....	
North Amer. Cem. com.[29]	11-18-30	2½	3	
North Amer. Cem. 7% pfd.[29]	11-18-30	17	20	
North Shore Mat. 1st 5's[15]	11-18-30	95	.....	
Northwestern States P. C.[37]	11- 1-30	110	120	$2 Apr. 1
Ohio River Sand com.	11-14-30	.....	15	
Ohio River Sand 7% pfd.	11-14-30	.....	97	
Ohio River S. & G. 6's[16]	11-15-30	85	90	
Oregon P. C. com.[20]	11-14-30	9	11	
Oregon P. C. pfd.[20]	11-14-30	89	90	
Oregon P. C. conv. pfd.	11-14-30	83	86	
Pacific Coast Aggr. com.[50]	10-30-30	2½	.....	
Pacific Coast Aggregates pfd.	11- 3-30	3	6	
Pacific Coast Cement 6's[5]	11-15-30	75½	76	
Pacific P. C., new com.[5]	11-13-30	19¼	24	
Pacific P. C., new pfd.[5]	11-13-30	75	79	1.62½ qu. Oct. 4
Pacific P. C. 6's[5]	11-13-30	98½	.....	
Peerless Cement com.[21]	11-15-30	6½	8	
Peerless Cement pfd.[21]	11-15-30	70	80	1.75 Oct. 1
Penn.-Dixie Cement pfd.	11-17-30	27	30	
Penn.-Dixie Cement com.	11-17-30	4⅜	4¾	
Penn.-Dixie Cement 6's	11-17-30	74	.....	
Penn. Glass Sand Corp. 6's	11- 5-30	99½	101	
Penn. Glass Sand pfd.	11- 5-30	100	.....	1.75 qu. Oct. 1
Petoskey P. C.	11-17-30	5	7	15c qu. Apr. 1
Port Stockton Cem. com.[20]	11-14-30	No market		
Riverside Cement com.[5]	11-13-30	10½	12¾	
Riverside Cement pfd.[20]	11-14-30	68	72	1.50 qu. Nov. 1
Riverside Cement, A[20]	11-14-30	10	14	31¼c qu. Nov. 1
Riverside Cement, B[20]	11-14-30	2	.....	
Roquemore Gravel 6½'s[17]	11-15-30	98	100	
Santa Cruz P. C. com.[5]	11-13-30	90	.....	$1 qu. Oct. 1
Schumacher Wallboard com.	10-31-30	8	9	
Schumacher Wallboard pfd.	10-31-30	.....	23½	50c qu. Nov. 15
Southwestern P. C. units[44]	11-13-30	240	.....	
Standard Paving & Mat. (Canada) com.	11-17-30	15	15½	50c qu. Nov. 15
Standard Paving & Mat. pfd.	11-17-30	80½	82	1.75 qu. Nov. 15
Superior P.C., A[20]	11-14-30	31	35	27½c mo. Dec. 1
Superior P. C., B[20]	11-14-30	7	10	25c qu. Sept. 20
Trinity P. C. units[37]	11- 1-30	130	140	
Trinity P. C. com.[37]	11- 1-30	30	40	
Trinity P. C. pfd.[29]	10-21-30	107	110	
U. S. Gypsum com.	11-17-30	40¼	41	40c qu. & 50c ex. Dec. 31
U. S. Gypsum pfd.	11-17-30	119	124	1.75 qu. Dec. 31
Universal C. & L. com.[3]	11-18-30	No market		
Universal G. & L. pfd.[3]	11-18-30	No market		
Universal G. & L., V.T. C.[3]	11-18-30	No market		
Universal G. & L. 1st 6's[3]	11-18-30	No market		
Warner Co. com.[16]	11-15-30	34	35	50c qu. & 25c ex. Oct. 15
Warner Co.1st 7% pfd.[16]	11-15-30	96	99	1.75 qu. Oct. 1
Warner Co. 1st 6's[8]	11-18-30	96½	99	
Whitehall Cem. Mfg. com.[36]	10-24-30	80	.....	
Whitehall Cem. Mfg. pfd.[36]	10-24-30	50	.....	
Wisconsin L. & C. 1st 6's[15]	11-18-30	95	.....	
Wolverine P. C. com.	11-17-30	3⅛	3⅞	15c qu. Nov. 15
Yosemite P. C., A com.[9]	11-13-30	2	3	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler Reading & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simon & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [33]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill. [50]Martin Judge Co., San Francisco, Calif. [51]Hemphill, Noyes & Co., New York City.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Consolidated Cement com. v.t.c., 3220 shs.[1]	1½ per share	.....
Universal Gypsum and Lime, 300 shs.[3]	$4 for the lot	.....
Universal Gypsum and Lime, 200 shs.[3]	$2 for the lot	.....
Holliston Trap Rock Co. com.,[2] 67 shs., per sh.	35	.....

[1]Price at auction by Wise, Hobbs & Arnold, Boston, Dec. 18, 1929. [2]Price at auction by R. L. Day & Co., Boston, July 16, 1930. [3]Price at auction by Adrian H. Muller & Son, New York, August 6, 1930.

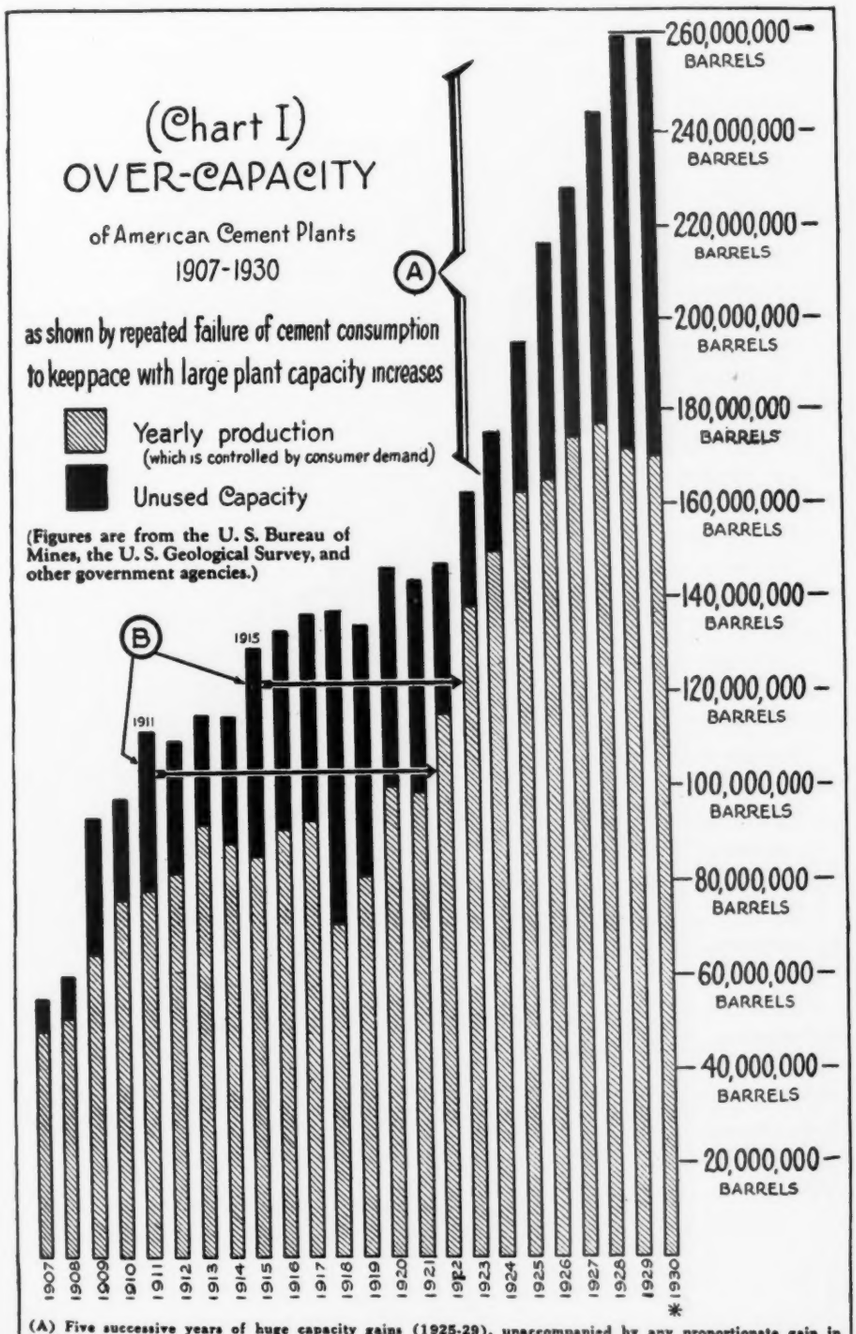
Newspaper Analysis of the Portland Cement Industry

THE CHICAGO, ILL., *Journal of Commerce,* of November 10, contained a signed article by Erwin W. Boehmler on the cement industry, which is of general interest to all ROCK PRODUCTS' readers. We presume most cement manufacturers have already seen the original, which apparently was timed to appear the week before the annual meeting of the Portland Cement Association in Chicago. Of course it contains nothing new to portland cement manufacturers, but is interesting as a popular exposition of the present economic position of the industry; and probably helpful in educating investors in some of the pitfalls to be avoided.

The article follows:

"Stimulated by extensive road-building programs, the production of portland cement in the United States in the first eight months of the current year was practically equal to the output in the corresponding portion of 1929. This performance was recorded, notwithstanding a decline of about one-fifth in the total building and engineering construction work. Because of the cement requirements of the paving industry, this commodity is in a comparatively strong statistical position, as contrasted with other building materials. With the likelihood that road-building will be continued during the ensuing year and the further likelihood that building and construction projects will get under way during that period, an increased demand for cement is indicated.

"Although demand and production in the current year approach an equilibrium and consumption of cement has kept up to the levels of a year ago, it is not likely that earnings of the manufacturers will be maintained at the levels of last year, due to the somewhat lower price prevailing. The re-

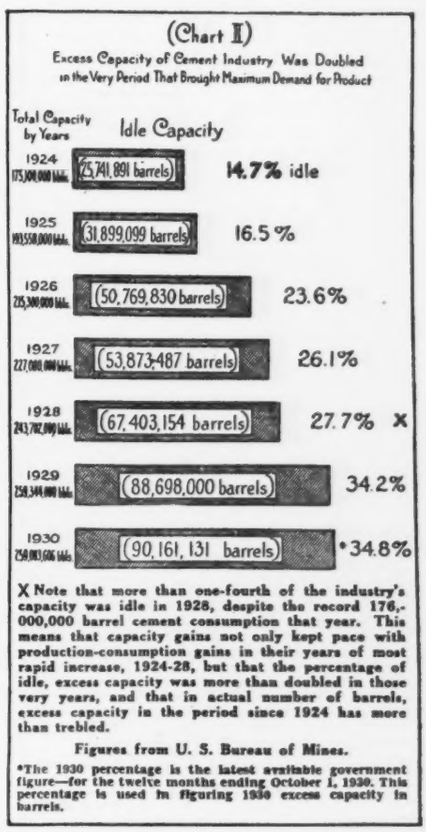


(A) Five successive years of huge capacity gains (1925-29), unaccompanied by any proportionate gain in production and consumption, have contributed to the present large over-capacity of the American cement industry.

(B) The huge excess capacity piled up since 1925 has been accumulated despite the warnings of the year 1911, whose new capacity was not matched by production for eleven years, and the second warnings of 1915, whose contribution to the surplus was not absorbed until 1923.

Over-capacity, and its attendant reduced operations and unemployment, result whenever production (which is rigidly held in check by consumer demand) cannot keep pace with new plant construction and mill enlargements.

*Estimated total for entire year 1930 is figured at same rate as set by first nine months of the year. A heavy decline indicated for the final three months, however, may cause a much sharper drop in production.



X Note that more than one-fourth of the industry's capacity was idle in 1928, despite the record 176,000,000 barrel cement consumption that year. This means that capacity gains not only kept pace with production-consumption gains in their years of most rapid increase, 1924-28, but that the percentage of idle, excess capacity was more than doubled in those very years, and that in actual number of barrels, excess capacity in the period since 1924 has more than trebled.

Figures from U. S. Bureau of Mines.

*The 1930 percentage is the latest available government figure—for the twelve months ending October 1, 1930. This percentage is used in figuring 1930 excess capacity in barrels.

BALANCE SHEET COMPARISON OF CEMENT MANUFACTURERS

	Alpha Portland —Cement Co.—		International —Cement Corp.—		Lehigh Portland —Cement Co.—		Pennsylvania-Dixie —Cement Corp.—	
	Sept. 30, '30	Dec. 31, '29	Dec. 31, '29	Dec. 31, '28	Nov. 30, '29	Nov. 30, '28	Sept. 30, '30	Dec. 31, '29
ASSETS								
Current assets	$10,442,137	$10,385,327	$10,163,699	$10,069,095	$18,873,234	$19,272,805	$ 6,578,601	$ 6,276,194
Current liabilities	1,028,324	1,165,722	1,953,251	2,057,851	1,910,106	2,310,467	556,132	684,855
Net working capital	$ 9,413,813	$ 9,219,605	$ 8,210,448	$ 8,011,243	$16,963,118	$16,962,338	$ 6,022,469	$ 5,591,339
Total assets	$32,342,206	$32,729,677	$55,624,869	$53,811,617	$55,122,073	$55,994,335	$31,753,626	$31,869,005
CAPITALIZATION								
Funded debt	.....	.....	17,995,500	18,000,000	.....	.....	10,929,000	11,564,000
Preferred stock	2,000,000	2,000,000	.....	.....	21,119,100	21,696,700	13,588,800	13,588,800
Com. stock and surplus	28,568,796	28,849,986	35,119,389	32,975,666	30,941,785	30,841,531	6,430,106	5,936,158

flection of less satisfactory performance has already been found in such revenue reports as have been published covering recent operating periods. During the first seven months of 1929 cement sold at about $1.65 a barrel, which contrasts with prices of about $1.60 a barrel during 1930 to date.

"While production in the first quarter of the current year was in excess of shipments, production and shipments practically balanced in the following quarter and in July and August shipments exceeded production. At the close of August the stocks on hand were slightly less than at the close of the 1929 year.

"Both the productive capacity of the industry and the consumption of cement have advanced fairly steadily and within two decades, output has increased from less than 48,000,000 bbl. in 1907, to a record of 176,298,846 bbl. in 1928. The production receded to about 171,000,000 bbl. in 1929, and estimates indicate a slight shrinkage to 169,000,000 bbl. for the full 1930 year on the basis of the 1.01% reduction in output in the first nine months of the current year.

"Price, production, shipments and inventory figures for the fifteen years and nine months to September 30, 1930, are:

	Price (†)	Production (‡)	Shipments (‡)	Stocks on hand (¶)
1915	.....	7.15	7.22	11.31
1916	.....	7.59	7.85	11.65
1917	.....	7.72	7.54	11.08
1918	.....	5.90	5.89	9.39
1919	.....	6.70	7.17	9.81
1920	.....	8.31	7.99	7.28
1921	1.931	8.19	7.92	10.16
1922	1.805	9.49	9.71	9.57
1923	1.881	11.45	11.33	9.25
1924	1.843	12.40	12.15	13.18
1925	1.789	13.43	13.06	16.05
1926	1.744	13.67	13.48	18.88
1927	1.680	14.33	14.24	19.79
1928	1.670	14.66	14.62	22.69
1929	1.601	14.18	14.12	24.39
1930—				
January	1.576	8.50	4.96	27.08
February	1.617	8.16	7.01	28.25
March	1.617	11.23	8.83	30.65
April	1.617	13.52	13.34	30.87
May	1.608	17.25	17.22	30.89
June	1.600	17.24	18.78	29.36
July	1.600	17.08	20.15	26.29
August	1.600	17.82	20.30	23.81
September	1.600	.....	.....	.....

†Price is stated f.o.b. dollars a barrel; average annual price for the years 1915-1929; monthly average price for 1930.

‡Average monthly production for the years 1915-1929, and production by months for 1930. Stated in units of 1,000,000 bbl.

¶At the end of the calendar years 1915-1929 and at the end of the month in 1930. Stated in units of 1,000,000 bbl.

"While the output of the cement industry has expanded almost steadily, the productive capacity of the trade has been extended at an even greater rate, with the manufacturers of this commodity in recent periods building about three barrels of new capacity for every two barrels of new demand (see A on Chart I). At the present time, the cement industry has an over-production of about 90,000,000 bbl., a volume almost as large as the total cement production in the United States in any year prior to 1920, and practically equivalent to the combined annual production of the three leading cement-making nations of Europe.

"Most of this over-capacitation has developed since 1923, since which time approximately 113,000,000 bbl. of new capacity have been added, as contrasted with 91,000,000 bbl. in the sixteen preceding years. In 1907, approximately 11% of the total manufacturing capacity of the industry was idle and two years later jumped to 31%. In only four years since 1909, has the proportion of idleness dropped below 20%, and in the 1918 year reached as high as 48%. During 1929, slightly more than 34% of the cement producing capacity remained idle, and on the basis of production figures to date, a small further increase will be recorded during the current year.

"It is noteworthy that in every year subsequent to 1909, the succeeding year failed to absorb the additional production capacity erected in any one year. In fact, the additions made to capacity in 1911 were not fully absorbed for over a decade (see B on Chart D). Because of several years of rapid gain, from 1922 to 1925, the extent of excessive capacity was cut down. In the three succeeding years the rate of gain in production slowed down, but the erection of additional capacity continued at a more rapid pace.

"This existence of the large volume of idle production capacity necessarily weakens the trade position of the manufacturers. In every year since 1921, there has been a reduction in the average price per barrel of cement. Some indication of the effect of industrial trends in the cement trade is indicated in the compilation of revenue figures of several leading cement producers shown in Table I.

TABLE I. REVENUE FIGURES OF SEVERAL LEADING CEMENT MANUFACTURERS OVER A SIX-YEAR PERIOD

	Alpha Portland Cement Co.	International Cement Corp.	Lehigh Portland Cement Co.	Penn-Dixie Cement Corp.
1930	†	‡	¶	§
Sales	$10,294,030	$25,930,394	$	$ .....
Net income	1,280,017	3,446,766	1,534,478	417,192
Earned a share	1.60	5.45	0.16	(d) 1.34
1929				
Sales	11,368,969	28,370,032	19,346,791	9,610,646
Net income	1,815,018	4,950,433	2,737,477	332,268
Earned a share	2.36	7.88	2.79	(d) 1.55
1928				
Sales	13,546,628	27,595,096	23,522,906	11,838,443
Net income	2,585,535	5,149,388	4,124,391	1,293,851
Earned a share	3.44	7.90	5.76	0.90
1927				
Sales	13,529,329	23,671,139	27,642,823	12,118,114
Net income	2,359,286	4,554,172	4,118,844	1,967,493
Earned a share	3.74	6.90	5.65	2.64
1926				
Sales	12,962,239	21,623,582	32,659,564	14,712,450
Net income	2,536,529	4,355,199	5,243,887	.....
Earned a share	4.04	6.52	8.04	.....
1925				
Sales	15,459,969	17,713,900	31,441,728	13,900,023
Net income	3,814,579	3,976,385	6,251,103	.....
Earned a share	6.20	7.04	10.38	.....

†1930 figures are for 12 months ended September 30, while in previous years figures are for the 12 months ended December 31. Net sales are shown for all periods.

‡1930 figures are for 9 months to September 30, and in other years for the 12 months periods ending December 31. Sales figures are gross.

¶1930 net income is for the 12 months ended August 31. In all other years, the figures are for the fiscal years ended November 30. Net sales are shown for 1925 and 1926, while gross sales are shown for succeeding years.

§1930 sales and earnings are for 12 months ended September 30. In previous periods, figures are for calendar years. Sales figures are net and in 1926 and 1925 are for the predecessor companies. (d) Deficit or loss.

"Notwithstanding the fact that the industry has capital equipment far in excess of any near term requirements, trade publications in recent months have carried items with reference to the erection of additional production facilities. According to these items, plants are planned at Tulsa, Okla., St. Louis, Mo., Portland, Ore., Macon, Ga., Vicksburg, Miss., and the state of South Carolina is reported as contemplating the erection of a plant.

"As early as 1926, one commentator on the status of the cement industry wrote: 'Annual productive capacity is now close to the 200,000,000 bbl. mark, or 25% in excess of the largest requirement ever experienced. . . . The country thus finds itself in 1926 with an excess capacity of more than 40,000,000 bbl., so that 20% of portland cement plant investment is inoperative. In view of present conditions and prospective demand, it would seem that any additions to portland cement plant capacity at this time or in the near future at least would be unwise.' As contrasted with a 20 to 25% overcapacity in 1926, there are today excess production facilities of close to 35%, as shown on Chart II."

Consumers Company, Chicago, Offers New Stock

THE common stockholders of record November 21, of the Consumers Co., Chicago, Ill., will be offered right to purchase on or before December 20 one additional share of common stock at $5 a share for each two shares held.

The time limit of the purchase warrants permitting the purchase of one voting trust certificate representing one share of common stock at $5 which was to expire January 1, 1931, has been extended to January 1, 1933.

The Consumers Co., in addition to an extensive retail business in building materials and coal, is a large producer.

U. S. Gypsum Declares Extra Dividend

THE DIRECTORS have declared an extra dividend of 50 cents per share in addition to the regular quarterly dividend of 40 cents per share on the common stock, par $20, both payable December 31 to holders of record December 15. This is the first extra distribution on these shares since 1927.

Recent Dividends Announced

Consumers Co. 6% pr. pfd. A (qu.)	1½%	Jan. 1
Lehigh Portland Cement pfd. (qu.)	$1.75	Jan. 2
Limestone Prod. Corp. 7% pfd. (qu.)	0.62½	Jan. 1
Material Service (qu.)	0.50	Dec. 1
U. S. Gypsum com. (qu.)	0.40	Dec. 31
U. S. Gypsum com. (extra)	0.50	Dec. 31
U. S. Gypsum pfd. (qu.)	1.75	Dec. 31

Certain-teed Products Corp.'s Nine-Months' Earnings

THE Certain-teed Products Corp., New York City, one of the largest manufacturers of gypsum and other building material products, reports 3 and 9 months' earnings as follows:

CONSOLIDATED EARNINGS, THREE MONTHS, TO SEPTEMBER 30

	1930	1929
*Gross profit	$ 805,542	$1,220,949
Other income	59,592	32,472
Total income	865,134	1,253,421
Expenses and bank interest	1,093,226	1,102,254
Bond interest	177,632	185,821
Federal taxes	1,854	7,600
Sundry adjustments (net)	11,650	8,045
Net loss	$ 419,228	$ 50,299

NINE MONTHS, TO SEPTEMBER 30

	1930	1929
*Gross profit	$2,668,713	$3,164,150
Other income	111,515	48,518
Total income	2,780,228	3,212,668
Expenses and bank interest	3,394,858	3,334,798
Bond interest	532,897	560,379
Federal taxes	13,560	29,800
Sundry adjustments (net)	15,080	3,468
Net loss	$1,176,167	$ 715,777

*Less depreciation and depletion, 3 months, 1930, $354,372; 1929, $372,530; 9 months, 1930, $1,083,104; 1929, $1,124,917.

George M. Brown, president, states July and August recorded the greatest depression over a 60-day period that the company has had to experience since the present depression began. Under such conditions as then existed, heavy charges for depreciation and all other fixed charges greatly increased the cost of the very small volume of goods produced. September showed a recovery to the best basis of the present year. He said further:

"Based on September operations, a modest return of volume would immediately improve the showing of the company. We are concentrating our efforts on the institution of operating economies along lines that will permit the company to take full advantage of a return to more normal business conditions."

Financial Editor's Comment on U. S. Gypsum's Extra

IN A SIGNED ARTICLE in the *New York* (City) *Telegram*, Albert K. Ettlinger, financial editor, writes:

"Action of the directors of U. S. Gypsum Co. in paying an extra dividend of 50 cents a share on the common stock in addition to the regular quarterly dividend of 40 cents a share is a very decided indication that business of the corporation has exceeded the expectations of the management. U. S. Gypsum during the recent market decline was a fairly stable issue. The latest step of directors was responsible for a moderate increase in new buying, although the stock at the present time is only about 3 points above its low for the year. The report of the company for the first six months of this year showed net income of $2,891,750, equal to $2.24 a share on 1,170,470 common shares, as compared with $2,329,244, equal to $2.70 a share on 765,027 common shares in 1929.

"The company is probably reflecting the benefits of an expansion program which was completed last year. Five new plants were put into operation, but they did not contribute much to earnings until the last few months of the year."

Warner Co. Preferred To Be Traded on New York Curb

THE WARNER CO., Philadelphia, Penn., producers of sand, gravel, lime and ready-mix concrete and building material dealers, has been granted trading privileges on the New York curb market for 50,000 shares of $7 first preferred stock, no par value, with warrants for common-stock purchase privileges. The unit of trading is 50 shares.

Called for Redemption

BASALT ROCK CO., INC., 1st 7s, 1933, in the amount of $13,000, have been called for redemption at 101 on December 1, 1930, at the Anglo-California Trust Co., San Francisco, Calif.

Peerless Cement Shares to Be Traded on New York Curb

THE 320,000 no par shares of common stock of the Peerless Cement Corp., Detroit, Mich., have been admitted to unlisted trading privileges on New York Curb Exchange. The Peerless Cement Corp. is the new name of the former Peerless-Egyptian Cement Co.

International Cement Earnings for October

THE net profit of the International Cement Corp., New York City, after federal tax for October, 1930, is estimated at $356,000, as compared with $277,000 for October, 1929. Net profit for first 10 months of the current year is estimated at $3,803,000, against $3,805,000 in the similar period of last year. The earnings for October, 1930, are equivalent to 56 cents a share, and for the 10 months to $5.98 a share on the 635,763 shares now outstanding. This compares with 44 cents a share for October, 1929, and $6.06 a share for the 10 months of 1929 on 627,524 shares then outstanding.

Prominent Iowa Gravel Man Killed in Auto Accident

INJURIES suffered in an automobile accident near here Thursday night proved fatal early the morning of November 13 to E. W. Boynton, of Muscatine, Iowa. Three other persons were injured in the accident.

Mr. Boynton's son, E. W. Boynton, Jr., driver of one of two cars which collided, was seriously hurt. Mr. Boynton was the vice-president and superintendent of the Northern Gravel Co., Muscatine.

New England Lime Co. Bond Holders Form Protective Committee

A BONDHOLDERS' PROTECTIVE COMMITTEE has been named with R. S. Peotter, chairman, and a depository agreement made for the handling of the $1,200,000 of 6% bonds issued in 1925 by the New England Lime Co. The company, which owns and operates a number of quarry and lime manufacturing properties near Pittsfield, Mass., has failed to keep up in sinking fund retirement.

This sinking fund was provided to retire the bonds, the agreement calling for 25% of net earnings each year to be devoted to this fund. Expectations are that the company will default on interest due January 1, 1931, and in preparation the protective committee has been formed and bonds are being collected.

The New England Lime Co. was financed in 1925 to the extent of $1,350,000 of Series A bonds, maturing July 1, 1935. There is no connection between this company and the Marblehead Lime Co., which was financed previous to the New England Co. deal. New England Lime Co. has been engaged in producing calcium and magnesium lime mainly used in the building trades.

"Shortly after the financing, the company began to feel the effects of competition with gypsum, and this was followed by a sharp reduction in building," states Mr. Peotter, chairman of the protective committee. "The textile industries migrated from New England to the south and there were other shrinkages industrially. This, along with a retrenchment in building, put the company in difficulties."

For the first eight months of this year the company's book figures showed a net loss of $237,000 and early in the year a bankers' committee was formed to watch the situation. Operation costs were drastically cut.

An effort is being made to increase sales and pull the company out of its financial troubles.

"The cash position in which the company finds itself indicates a default on the interest payment on the first mortgage bonds January 1," reads a report. "It is important that the bondholders' protective committee have sufficient bonds deposited with it to carry out any program decided upon," reads a statement from G. H. Pfau. The bonds are widely held in the Milwaukee, Wis., area.

The First Wisconsin Trust Co., Milwaukee, has been named as one of the depository agents. The membership of the committee in addition to Chairman Peotter is G. H. Pfau, A. R. Rogers, D. R. West, H. F. Pike, with William A. King of the Second Ward branch of the First Wisconsin National Bank, secretary.—*Milwaukee (Wis.) Journal.*

Idaho Lime Manufacturer Plans Expansion

THAT the Clearwater Lime Products Co. expects to spend in the neighborhood of $100,000 on improvements to its plant about three miles up the Clearwater river from Orofino, Idaho, was made known at the October meeting of the Orofino commercial club by company officers who were invited to the meeting to tell of their future plans. Besides about 35 members of the club, Dr. Logan G. Kimzey, Pullman, Washington, president; W. E. Allen, of the W. E. Allen Finance Co., Ray Brookings, Spokane, salesman of products; C. M. Loveland, manager and G. S. Burford, Colfax, secretary and treasurer of the Clearwater Co., were present.—*Stites* (Ida.) *Enterprise.*

Spartanburg (S. C.) Quarry Reopened for Local Work

WITH CRUSHING MACHINERY already in place and tested, operators of the quarry on what is known as "Hungry Hill," south of Spartanburg, S. C., announced recently that they were ready to begin delivery of 25,000 tons of stone to be used in the Metropolitan district sewerage disposal plants.

First consignments of the crushed stone will be to the McClelland Construction Co., holders of the contract for building the two disposal units on Fair Forest and Lawson Fork creeks. About 7000 tons will be delivered to be used in mixing concrete.

The Metropolitan commission will buy 18,700 tons of broken stone to be used in disposal plant filter beds. This larger rock will not be needed for several months. New machinery will be installed at the quarry to prepare the stone when it is needed.

The stone is an important item in the cost of constructing the system, but the contract price represents a considerable saving over first bids on the material from quarry agents. On advice of the commission's engineer the offers received when bids were taken were not accepted, being looked upon by the commissioners as excessive. By waiting until arrangements could be made to reopen the "Hungry Hill" quarry a saving of several thousand dollars was effected.

The quarry, which has been worked several times, is located near the Fair Forest disposal plant site. It is being operated by Mr. Ross of Charlotte and J. L. Von Glahn.

Under full operation the quarry is expected to turn out 500 tons a day.

Blasting has been carried on for several days. Trucks are used to carry the rock from the pit of the quarry to the crushers. The McClelland company has sublet a contract for delivery of the rock from the quarry to the disposal plant sites.

It is reported that the quarry operators may bid on the contract to supply rock needed in the new federal building here.—*Spartanburg (S. C.) Herald.*

Looks Like a Good Year Ahead in Louisiana

LOUISIANA voters on November 4 approved eight amendments to the state constitution, making possible the issuance of $82,000,000 in bonds for public improvements, including a new state capitol building.

A statement of what is involved in each of the eight propositions voted follows:

No. 1—Authorizes the issuance of $75,000,000 bonds against the existing 4-cent gasoline tax, pledging all revenues of the Highway Commission and the faith and credit of the state for the payment of the bonds. It sets aside $7,000,000 for paying part of the cost of a bridge across the Mississippi river at New Orleans, $8,000,000 for major bridges elsewhere in the state. The amendment guarantees from all highway funds of the state $7,000,000 yearly for the next four years for farmers' gravel roads, the funds to be distributed to the parishes on the basis of the ratio of uncompleted mileage in the state highway system to the whole uncompleted mileage in the state. It sets aside $700,000 yearly from highway funds for aiding the city of New Orleans.

No. 2—Levies an additional 1-cent gasoline tax, bringing the total state tax to five. The new tax is expected to yield about $1,800,000 a year. The amendment sets aside one-half the tax for an equalizing fund to be distributed by the State Department of Education to parishes in which available local funds are not sufficient for public education. Ten per cent. of the other half goes to the port of Lake Charles and the remainder to the port of New Orleans for improvements and maintenance for the public wharves.

No. 3—Authorizes the issuance of $5,000,000 bonds against the surplus in the state bond and interest tax fund, the money to be used for constructing and equipping a new state capitol at Baton Rouge.

No. 4—Permits parishes and municipalities to exempt new industries from local taxation for a period of five years.

No. 5—Authorizes the Orleans Levee Board to issue $1,000,000 bonds for the purpose of constructing an airport on Lake Pontchartrain.

No. 6—Authorizes the city of New Orleans to issue $4,500,000 bonds, applying $3,500,000 to retirement of outstanding indebtedness and $1,000,000 for the construction of public markets.

No. 7—Directs future legislatures to provide $12 per educable child for distribution to the parishes by the State Board of Education, thus increasing state aid for schools by about 50%.

No. 8—Doubles the pensions paid by the state to confederate veterans and their widows; makes the new rate $60 per month, compared to $30 monthly now being paid.

Minnesota Gravel Producer Has Biggest Year's Output

THE BECKER COUNTY SAND AND GRAVEL CO. with its spacious plant located about two miles northwest of Detroit Lakes, Minn., shipped out 3500 carloads of sand during the past year, according to an announcement made recently by Earl Mullen, manager of the company.

Enjoying its best season since its organization, the concern furnished its sand for several major paving jobs in the northwest and other commercial projects during the past summer. With its two processing plants going full blast night and day during the busy season, the company was able to fulfill its many contracts.

In addition to its two plants which are connected to the Northern Pacific railway, the company also has another plant recently purchased on the Soo line. The latter plant is not in operation at the present time. During the summer months much of the sand shipped out was used for the Hawley-Detroit Lakes paving job while the balance was sent to Fargo, Valley City, Jamestown, Edgely, Breckenridge and other towns in the vicinity.

A thorough examination of the plant revealed that the latest and best methods in processing the sand for commercial distribution are used. The plant has two shovels, one steam and the other gas. They load the rough product on dump cars which hold 5 cu. yd. each. The cars, five and six of them at a time, are hauled by industrial railway locomotives over narrow tracks to the hopper where the gravel is dumped.

From the hopper the gravel or rock is taken by belt conveyors to the scalping screen where the oversize material is rejected into a crusher and crushed to the proper size. After the crushing, the gravel is again taken on a belt back to the screen. All that goes through the screen is carried on another belt conveyor to the top of the plant where the sand is first struck by water at the rate of 1400 gal. per min.

Water for washing the sand is obtained from Brandy lake by means of a complete pumping system. As the sand is hit by the water it is put in a scrubber and screen, which is a cylinder with baffle plates. Following the washing process, the sand is shoved into screens for sizing, the sand and rock going into separate bins and loaded from there into the railway cars. When orders are slack, a stock pile for winter deliveries is made, this growing to several hundred carloads.

The complete plant is powered by a large Diesel engine. A pump engine is used to bring the water from the lake. Nearly all of the water used by the industry flows back into the lake. There is a great amount of waste material and this is carried out by the water and deposited on large piles near the lake.

Plans are being completed for increasing the output of the plant. Recently a portion of a farm north of the pit was purchased and test holes were dug. The sand in this vicinity is all especially good for commercial purposes and meets a steady market.

During the past summer, when the plant was operating day and night to satisfy the demand, 42 men were employed in two shifts.

Officers of the company are: E. W. Hallett, Crosby, president; Earl Mullen, Detroit Lakes, vice-president and manager; and M. W. Richards, Brainerd, secretary and treasurer.

A final analysis of the sand and gravel business shows that it is one of the most promising industries of Becker county with its numerous sand hills. And the fact that 3500 carloads were shipped out of the local pit this summer shows that there is a steady demand for the product.—*Detroit Lakes* (Minn.) *Tribune.*

Would Abolish Sand and Gravel Pits for Aesthetic Considerations

ROBERT MOSES, president of the Long Island Park Commission (New York), has added his voice and the influence of his commission to the tide of public sentiment for rigid control of gravel digging in and around Port Jefferson and Mount Sinai. In a letter received and made public here Mr. Moses said:

"Unquestionably these sand and gravel mining operations are a real menace to the community unless they are properly controlled by adequate laws, honestly and strictly enforced.

"Such operations at best employ a few men for a short period of time and may in some isolated cases prove a temporary benefit to a community, but unquestionably they always leave behind them irreparable damage. This is true both as to hydraulic operations in Long Island Sound and the pit operations on the mainland.

"Take, for example, a beautiful, natural bay opening into the Sound with wooded hills on either side and a settlement of homes on these hills. This, in general, is the situation on the north shore. The waters of the bay are navigable and provide good bathing and fishing. People are attracted to the communities, purchase homes, some small and some large enough to call estates. This brings real, permanent prosperity to the community and makes for a constant and material increase in real estate values.

"A sand company comes along, excavates and carries away the hills and trees, dredges tremendous holes in the bottom of the bay, in some places leaving sand bars, in others deflecting the currents and generally affecting the wash of the tides.

"All the beauty of the community is gone; the noise and dust of the machinery repel people, and the landscape thereafter is desolate and forbidding. The waters are dirty and unattractive for bathing, and the channels unsafe for boating. The result is that the land values all around decrease, people abandon or sell their homes for anything they can get; permanent labor moves to new territory for employment, and shopkeepers are thrown back on temporary transient labor for their customers.

"Certainly these sand operations affect the general welfare of the local community. Other distant communities are doubtless benefited by the sand which goes into contracts in their territory, but the only possible benefit to the community where the sand is located is the temporary employment of a small number of transient laborers and, in some cases, a small royalty paid to the town owning the lands under water.

"On the mainland pit operations are even worse. Deep pits are opened and abandoned as soon as the sand is extracted. They are often filled with water and are a constant danger to children, make excellent breeding pools for mosquitoes, and in general are a detriment to the neighborhood. In many cases it would cost more to fill up these deep pits than the land would be worth after it was filled.

"Last year I had a bill introduced in the legislature which gave the local authorities power to regulate these inland sand pits. This bill did not become a law, and received very little local attention or support.

"I think it is possible partially to control these sand and gravel mining operations under a zoning law, but there are some strong decisions to the effect that an owner cannot be prevented from developing the natural resources of his property. In the long run I think it essential to control these operations locally, under authorization of a special act of the legislature, rather than to depend wholly on general town or village zoning laws. There is no question but that the proposed licensing act will be fought in the legislature by the sand and gravel people and probably by some builders and contractors who would fear that the price of sand and gravel would be greatly increased. As a matter of fact, the sand and gravel business in New York City and most nearby communities is a monopoly of the most undesirable kind, and present prices are entirely arbitrary.

"As far as the real estate people are concerned, I think that there will be some opposed to this bill, but most of them will certainly be in favor. If the law is pushed by the press and civic agencies, it can be enacted, and there is no question but that it will be a great benefit to the people of Long Island."

* * *

With the above article given a prominent place in the *New York Times*, it looks as if the sand and gravel industry of New York needed to do a little something to educate the public to a better understanding of its economic place in industry.—Editor.

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Oct. 18	Limestone Flux Week ended Oct. 25	Sand, Stone and Gravel Week ended Oct. 18	Sand, Stone and Gravel Week ended Oct. 25
Eastern	2,671	2,111	10,231	10,036
Allegheny	2,427	2,199	6,554	6,129
Pocahontas	510	470	1,724	1,396
Southern	593	572	9,915	9,604
Northwestern	1,303	1,034	6,052	5,444
Central Western	627	575	9,331	8,739
Southwestern	444	427	6,296	6,753
Total	8,575	7,388	50,103	48,101

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1929 AND 1930

District	Limestone Flux 1929 Period to date Oct. 26	Limestone Flux 1930 Period to date Oct. 25	Sand, Stone and Gravel 1929 Period to date Oct. 26	Sand, Stone and Gravel 1930 Period to date Oct. 25
Eastern	144,875	123,938	493,736	354,895
Allegheny	155,160	116,891	318,352	274,202
Pocahontas	16,384	19,873	43,053	54,673
Southern	25,557	27,035	382,910	350,905
Northwestern	49,198	41,717	277,276	236,266
Central Western	22,556	20,540	458,596	421,251
Southwestern	21,497	19,212	297,910	276,819
Total	435,227	369,206	2,271,833	1,969,011

COMPARATIVE TOTAL LOADINGS, 1929 AND 1930

	1929	1930
Limestone flux	*435,227*	*369,206*
Sand, stone, gravel	*2,271,833*	*1,969,011*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of November 15:

SOUTHERN FREIGHT ASSOCIATION DOCKET

52655. **Marble, crushed, or marble chips,** from Gulf Ports to Gantt's Quarry, Ala., and Whitestone, Ga., import, applicable from shipside. Class rates now apply. Proposed rates on crushed marble or marble chips, (See Note 3.) Proposed rates in cents per net ton:

From	(*)	(†)
New Orleans, La.	219	255
Gulfport, Miss.	205	247
Mobile, Ala.	184	230
Pensacola, Fla.	173	230

The proposed rates are made on basis of 115 per cent of the I. C. C. 17517 scale.

*To Gantt's Quarry, Ala.
†To Whitestone, Ga.

52682. **Sand, silica,** from Ottawa, Ill., to Stone Mountain, Ga. It is proposed to establish specific rate on silica sand, carload, from Ottawa, Ill., to Stone Mountain, Ga., of 450 cents per ton of 2000 lb. made on basis of combination over Evansville, in lieu of the present rate of 465 cents per ton of 2000 lb. arrived at by applying the Macon, Ga., rate to Stone Mountain, Ga., under authority of the intermediate destination rule published in Item 200-A, of Supplement 1 to Agent B. T. Jones' tariff No. 107-DD, I. C. C. No. 2297.

52684. **Cement** from Austin and Mankato, Minn., to Newtown, Switzer, Paris, Georgetown and Frankfort, Ky., in connection with the Frankfort & Cincinnati Railroad. It is proposed to cancel, on the obsolete theory, the rates on cement, hydraulic, portland or natural, carloads, from and to above-named points. Class rates to apply after cancellation.

52717. **Plaster and gypsum blocks,** from points in the states of New York, Pennsylvania and New Jersey to points in the states of North Carolina, South Carolina and Virginia. It is proposed to revise rates on blocks (fireproofing), gypsum, plaster, terra cotta or clay, carloads, from producing points in the states of New York, New Jersey and Pennsylvania as named in Agent Curlett's I. C. C. A-280 to Carolina points on basis of combination, using published commodity rates to Virginia gateways, plus proportional rates beyond, as published in Agent Glenn's I. C. C. A-730. A statement of rates from and to representative points will be furnished upon request.

52766. **Talc, crude or ground,** from Chatsworth, Ga., to Tampa, Fla. At present combination rate applies. It is proposed to establish a through rate of 589c per ton of 2000 lb. on talc, crude or ground, carload, minimum weight 50,000 lb., from Chatsworth, Ga., to Tampa, Fla.

52789. **Stone, crushed, rubble or broken,** from points in Virginia to Southern Ry. Appalachian Division stations. At present combination rates apply. It is proposed to establish rates on stone, crushed, rubble or broken, carloads, from Marion and Schuleen, Va., to Southern Ry. stations between Bristol and Mountain City, Tenn., on basis Docket 17517 (122, I. C. C. 133), joint line scale; from Marion, Schuleen, Miles, Pembroke and Ripplemead, Va., to Southern Ry. stations between Bristol and St. Charles, Va., including Ayers and Yuma, Va., on basis Docket 15216 (139, I. C. C. 88), joint line scale and to Southern Ry. stations in Tennessee south of Mocasin Gap, Va., to Bulls Gap, Tenn., on basis Docket 17517 (122, I. C. C. 133), joint line scale, holding above suggested rate to Mocasin Gap, Va., as minimum at stations in Tennessee south thereof. Statement of the proposed rates will be furnished upon request.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

SOUTHWESTERN FREIGHT BUREAU DOCKET

21413. **Cement, hydraulic, portland or natural,** from Utica, Ill., to Southeast Missouri. To amend Items 875, 940 and 995 of S. W. L. Tariff 68L, adding Utica, Ill., as an origin point at the same basis as La Salle, Ill., to destinations in Southeast Missouri covered by the above tariff, on cement, hydraulic, portland or natural, carloads, which will have the effect of providing for abritrary of 13c to St. Louis and East St. Louis, and 15c to Cairo or Thebes, respectively. These rates to be added to the rates applying from such points in order to determine the through rates. Shippers state that Utica is located but 4.9 miles directly east of La Salle and is on the same basis as the latter point in connection with all class and commodity rates to the Southwest.

21420. **Cement,** from Arkansas points to points in Texas. To establish the following rates in cents per 100 lb. on cement, portland, natural or hydraulic, carloads, **minimum weight 50,000 lb., except** when marked capacity of car used is less, the actual weight but not less than 40,000 lb. will apply (except where otherwise provided) from and to points shown below.

To	From Foreman, Ark.	From Okay Junction, Ark.
Capps, Tex.	29½	31½
Altman, Tex.	29½	31½
Phillips, Tex.	30	31½
Spann, Tex.	30	31½
Exum, Tex.	30	31½
Dalmor, Tex.	30	31½

The destinations covered by this proposal are located on the newly constructed line of the C. R. I. & G. Ry., extending from Morse to Dalhart, Tex. The proposed rates are constructed on basis of Scale 4 of the I. C. C. Docket 8182 scale of rates, which is in effect to other contiguous points in Oklahoma and Texas.

21423. **Sand and crushed stone,** from Cape Girardeau and Marquette, Mo., to Illinois points. To establish a rate of 75c per ton of 2000 lb. on sand and crushed stone, in straight or mixed carloads (See Note 3), from Cape Girardeau and Marquette, Mo., to Thebes, McClure, Reynoldsville, Potts and Ware, Ill. Shippers state that the proposed rates will place them on a parity and enable them to meet competition of Illinois shippers.

21430. **Slate,** from Mena, Ark., to points in S. W. F. B. territory. To establish the 9702 crushed rock scale, as published in S. W. L. Tariff 114D, on slate, crushed or ground, carloads, minimum weight 80,000 lb., or if marked capacity of car is less, marked capacity of car will govern, from Mena, Ark., to all destinations in S. W. F. B. territory. It is stated that the commodity involved is nothing more or less than crushed and ground stone, and is to be used as an abrasive in the manufacture of composition roofing. This will be new traffic in this section and will afford a substantial movement and will also assist the Southwestern Lines in developing additional tonnage which has heretofore moved generally from Eastern origins.

21442. **Cement,** from Southwestern producing points to Louisiana points. To publish rates on cement, carloads, minimum weight 50,000 lb., from Southwestern producing points to points on the N. O. N. & N. Ry. and I. C.-Y. & M. V. R. R. on the following basis: Publish I. C. C. Docket 16845 basis of rates to stations on the new line of the N. O. N. & N. Ry., also revise present rates to points on the I. C.-Y. & M. V. R. R., as indicated below, to correct basis under application of the I. C. C. Docket 16845 scale (S. W. L. Tariff 169A, I. C. C. 2192):

To	*Distance	From Groups 1	2	3	4
Slaughter, La.					
Route	....	1	2	3	4
Miles	....	704	559.2	432.8	398.6
Rate	....	28	24	21	20½

To	*Distance	From Groups 5	6	7	8
Slaughter, La.					
Route	....	5	6	7	8
Miles	....	287.5	355.8	352.4	488
Rate	....	17	19	19	22

N. O. N. & N. Ry. stations
Olive Branch, La..... 5 — Reimers, La. 13
Rileys, La. ..... 10 — Bluff Creek, La..... 16
(Intermediate to Grangeville, La.)
Grangeville, La..... 18
Rate, same as Pine Grove, La. (base point).

To	*Distance	From Groups 1	2	3	4
Pine Grove, La.					
Route	....	9	9	9	9
Miles	 24	728	583	457	423
Rate	....	28½	25	21½	20½

To	*Distance	From Groups 5	6	7	8
Pine Grove, La.					
Route	....	9	9	9	10
Miles	 24	312	380	376	512
Rate	....	18	20	20	23

Marshall, La. 27
Montpelier, La. 31
Georgetown, La..... 33
Rate, same as to Natalbany, La. (base point).
Yawn, La. 36
(Intermediate to Little River, La.)
Little River, La..... 38
Woodhaven, La..... 42
Rate, same as to Natalbany, La. (base point).
Addison, La. 45
Intermediate to Mason, La.)
Mason, La. 46
Rate, same as to Natalbany, La. (base point).

To	*Distance	From Groups 1	2	3	4
Natalbany, La.					
Route	....	12	13	14	15
Miles	 47	727	587	461	427
Rate	....	29¼	25	21½	20½

To	*Distance	From Groups 5	6	7	8
Natalbany, La.					
Route	....	16	17	18	11
Miles	 47	316	384	380	516
Rate	....	18	20	20	23

*Distance from Slaughter, La.

Explanation of Groups
Group 1—Chanute, Kan., etc.
Group 2—Ada, Okla.
Group 3—Harrys, Tex., etc.
Group 4—Ft. Worth, Tex., etc.
Group 5—Houston, Tex.
Group 6—Foreman, Ark.
Group 7—Okay Junction, Ark.
Group 8—Atco, Tex.

CENTRAL FREIGHT ASSOCIATION DOCKET

26600. To establish on **crushed stone**, carloads (See Note 3), from Buffalo, N. Y., to Athol Springs, N. Y., rate of 60c. Present rate, 70c.

Sup. 1 to W. D. A. 26527. White Docket Advice 26527, Docket Bulletin 1871, dated October 20, 1930, covering proposal to establish on **lake and beach sand**, carloads, from Michigan City, Ind., to Mishawaka, Ind., rate of $1.26 per net ton, is hereby withdrawn from the docket.

26627. To establish on **agricultural limestone**, in bulk, in open cars; **crushed stone**, in bulk, in open cars; **stone, rip-rap**, in open cars; **stone screenings**, in bulk, in open cars; and **stone tailings**, in bulk, in open cars (See Note 3), from Greencastle and Limedale, Ind., to Kokomo and Ridgeville, Ind., rate of $1.15 per net ton. Route—Via P. R. R. direct. Present rates—To Ridgeville, $1.26 per net ton (intermediate to Decatur, Ind.), and to Kokomo, 15c (sixth class), and C. F. A. L. Tariff 223.

26628. To establish on **stone**, viz., broken, rip rap, rubble, quarry scrap, rough and spawls, carloads (See Note 3), from Ellwood Junction and Koppel, Penn.

To	Prop.	Pres.
Toledo, O.	227	21½
Detroit, Mich.	.....	.....

Proposed rates are in cents per ton of 2000 lb.

26629. To establish on **sand and gravel**, in open-top cars, carloads (See Note 3), from Dresden, O., to Ohio points. (Rates in cents per ton of 2000 lb.)

To	Pres.	Prop.	To	Pres.	Prop.
Mohawk	80	60	Post Boy	80	75
Methan	80	65	Killbuck	80	75
Pomerene	80	65	Stone Creek	85	80
Nickels Spur	80	70	Fredericksburg	90	85
Layland	80	70	North Berne	90	85
Cavallo	80	75			

26632. To establish on **limestone, agricultural** (not ground or pulverized), in bulk, in open-top cars; **stone, crushed**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, in straight or mixed carloads (See Note 3), from Carey, O., to Kokomo, Ind., rate of 135c per net ton. Present rate, 18½c.

26634. To establish on **stone, crushed or broken, rip rap, rough, rubble and screenings**, carloads (See Note 3), from Milwaukee, Wis., via car ferry (rates in cents per net ton).

To	Prop.	Pres.
Bay City, Mich.	136	212
Jackson, Mich.	176	450
Saginaw, Mich.	136	212

26635. To establish on **sand and gravel**, carloads (See Note 3), from Mt. Carmel, Ill., to Oakland City, Ind., rate of 68c per net ton. Present rate, 73c per net ton.

26643. To establish on **crushed stone**, carloads (See Note 3), from Huntington, Ind. (rates in cents per net ton), to points in Indiana:

To	Prop.	Pres.	To	Prop.	Pres.
Summit	90	115	Angola	95	115
Pleasant Lake	90	115	Freemont	100	280

Route: Via Wabash Ry., Fort Wayne, Ind., and N. Y. C. R. R. Co.

26650. To establish on **agricultural limestone**, in bags or in bulk in box cars, carloads, minimum weight 80,000 lb., except when marked capacity of car is less, in which case marked capacity of car will apply, but not less than 60,000 lb., from Sibley, Mich., to points in Michigan, rates as shown below. Present and proposed rates:

To	Prop.	Pres.
Dundee, Mich.	127	110
Tecumseh, Mich.	125	120
Manchester, Mich.	135	130

26651. To establish on **crushed stone, slag and sand**, other than blast, engine, etc., carloads (See Note 3), from Chicago, Ill., to Michigan City, Ind., rate of 88c per net ton. Present rate, 95c per net ton.

26652. To establish on **crushed stone**, carloads (See Note 3), from Lewisburg, O., to points in Ohio, rates as shown in Exhibit A attached.

EXHIBIT A

Rates on crushed stone, carloads, in cents per ton of 2000 lb., from Lewisburg, Ohio (via Ivorydale, O.), to N. & W. Ry. stations in Ohio:

To	*Pres.	Prop.	To	*Pres.	Prop.
Mineral Sprgs.	20	125	Arion	20½	135
Rarden	20	125	McDermott	20½	135
Youngs	20	125	Rushtown	20½	135
Otway	20	125	Book	20½	135
Henley	20½	125	Portsmouth	20½	135
Brookside	20½	125			

*Cents per 100 lb.

26655. To establish on **crushed stone and crushed stone screenings**, carloads (See Note 3), from Marblehead, O., to Swanville, Penn., rate of 140c per net ton. Present rate, 252c per net ton, Buffalo rate under intermediate clause.

26656. To establish on **sand, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica**, carloads (See Note 3), from Glass Rock, O., to Roseville, O., rate of 70c per net ton. Route—Via N. Y. C.-P. R. R. Present rate, $1.20 per net ton.

26657. To establish on **crushed stone**, carloads (See Note 3), from Lima, O., to St. Marys, O., rate of 60c per net ton. Present rate, 90c per net ton.

Sup. 1 to W. D. A. 26391. White Docket Advice 26391, Docket Bulletin 1858, covering proposal to establish rates on **crude or raw dolomite and fluxing stone**, from Leetonia, O., to Warren and Youngstown, O., is hereby withdrawn from the docket.

26669. To cancel specific commodity rate on **cement, hydraulic, natural or portland**, straight or mixed carloads, as published in C. F. A. L. Tariff No. 218-G, from Union City, Mich., to points east of the Western Termini of Eastern Trunk Lines, permitting classification basis to apply in lieu thereof.

26670. To establish on **crushed stone and crushed stone screenings**, carloads (See Note 3), from Apex, O., to Cleveland, O., rate of 80c per net ton. Route—Via N. Y. C. R. R. direct through Alliance and Hugo, O., but not through Newton Falls, O. Present rate, $1.05 per net ton.

26686. To establish on **crushed stone**, carloads (See Note 3), from Spore, O., to points in Ohio, present and proposed rates as shown below:

To	Prop.	Pres.*	To	Prop.	Pres.*
Torch Hill	135	170	Briggs	145	170
Little Hocking	135	170	Constitution	145	170
Porterfield	145	170	Gravel Bank	145	170
Belpre	145	170	Scotts Landing	145	170

*Present rates intermediate to Parkersburg, W. Va.

26725. To establish on **cement, common, hydraulic, natural or portland** (in straight or mixed carloads), minimum weight 50,000 lb., marked capacity of car to govern if less, from Buffalo, N. Y., West Winfield, Bessemer, Neville Island, Crescentdale, Wampum, New Castle, Walford, Penn., and East Fultonham, O., to Smithfield, Chandler and Kolmont, O., rates as shown in Exhibit A attached. Route: P. R. R., Alliance, O., and N. Y. C. R. R. Present rates as shown in Exhibit A attached.

EXHIBIT A

Cement, carloads, to Smithfield, O., N. Y. C. R. R.

From	Prop.	Pres.
Buffalo, N. Y.	15	(2)
West Winfield, Penn.	9½	(2)
Bessemer, Penn.	8½	(2)
Neville Island, Penn.	8	(2)
Crescentdale, Penn.	9½	(2)
Wampum, Penn.	9½	(2)
New Castle, Penn.	9½	(2)
Walford, Penn.	10½	(2)
East Fultonham, O.	10½	16½

(2) No through rates. Combination of class rates to apply. Establishment of Smithfield, O., as a base point affects rates to P. & W. Va. as follows:

	—Chandler—	
To	Pres.	Prop.
Buffalo, N. Y.	14½	15
West Winfield, Penn.	9½	9½
Bessemer, Penn.	8½	8½
Neville Island, Penn.	8½	8
Wampum, Penn.	8½	9½
New Castle, Penn.	9	9½
Walford, Penn.	9	10½
East Fultonham, O.	11½	10½
	—Smithfield—	
To	Pres.	Prop.
Buffalo, N. Y.	14½	15
West Winfield, Penn.	9½	9½
Bessemer, Penn.	8½	8½
Neville Island, Penn.	8½	8
Wampum, Penn.	8½	9½
New Castle, Penn.	9	9½
Walford, Penn.	9	10½
East Fultonham, O.	11½	10½
	—Kolmont—	
To	Pres.	Prop.
Buffalo, N. Y.	14½	15
West Winfield, Penn.	9½	9½
Bessemer, Penn.	8½	8½
Neville Island, Penn.	8½	8
Wampum, Penn.	8½	9½
New Castle, Penn.	9	9½
Walford, Penn.	9	10½
East Fultonham, O.	11½	10½

26699. To establish on **sand, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica**, when loaded in open-top equipment (See Note 3), from River Valley, Penn., to points in Pennsylvania, rates as shown below (in cents per 2000 lb.):

To	Deliver'g line	Prop.	Pres.
Bessemer, Penn.	B. & L. E.	(1) 60	76
Clairton, Penn.	B. & L. E.	(1) 70	76
Coraopolis, Penn.	P. & L. E.	(2) 80	113
Ellwood City, Penn.	B. & O.	(3)100	101
	B. R. & P.	(3)100	101
Franklin, Penn.	Erie	(4)110	176
	N. Y. C.	(4)110	176
Greenville, Penn.	B. & L. E.	(1)100	139
McKeesport, Penn.	B. & O.	(3) 80	113
	P. & L. E.	(2) 70	113
Meadville, Penn.	B. & L. E.	(1)110	176
Monessen, Penn.	P. & L. E.	(2) 90	164
Munhall, Penn.	B. & L. E.	(1) 60	76
Oil City, Penn.	Erie	(4)110	176
	N. Y. C.	(4)110	176
Pittsburgh, Penn.	B. & O.	(3) 90	113
	P. & L. E.	(1) 70	113
Sharpsville, Penn.	Erie	(1)100	139
South Duquesne, Penn.	B & L. E.	(1) 60	76

(1) Rates on single line scale, P. S. C. Penn. Docket 8210 for actual distance.

(2) Rates 10c per ton over single line scale, P. S. C. Penn. Docket 8210 for actual distance.

(3) Rates 20c per ton over scale, P. S. C. Penn. Docket 8210.

(4) Rate same as applicable on common sand. Held to clear rate on common sand from Munhall, Penn., under P. S. C. Penn. Docket 6951.

26708. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica) **and gravel**, carloads (See Note 3), from Irving, N. Y., to Athol Springs, Buffalo, Derby and Lake View, N. Y., rate of 65c. Present rate, 70c.

26719. To establish on **crushed stone and crushed stone screenings**, carloads (See Note 3), from Huntington, Ind., to Liberty Mills, Roann, Pettysville and Mexico, Ind., rate of 60c per ton of 2000 lb. Present rates are: To Liberty Mills, Ind., 85c; intermediate to Columbus City, Ind., and sixth class rate of $2.30 to Roann and Pettysville, Ind., and $2.40 to Mexico, Ind.

26731. To establish on **spent or refuse grinding sand**, in box cars, carloads (See Note 3), from Butler, Penn., to Versailles, Penn., rate of $1.13 per ton of 2000 lb. Present rate, 13½c (sixth class).

TRUNK LINE ASSOCIATION DOCKET

M-1563. To establish on **crushed stone**, carloads (See Note 2), from Ellicott City, Hollofield Station, Woodstock, Marriottsville, Grove, Frederick, Lime Kiln, Buckeystown, Savage Factory, Dickerson, Md., Engle, Kearneysville, Martinsburg and Millville, W. Va., to W. & O. D. Ry. stations, Barcroft to Bluemont, Va., incl. Rates ranging from $1.20 to $1.50 per net ton. Reason—Proposed rates are same as mileage scale in I. C. C. Docket 17517, which basis has been authorized from Riverton, Va., to stations on the W. & O. D. Ry.

25019. To cancel commodity rate of 3c per 100 lb. on **limestone and fluxing stone**, carloads, minimum weight 80,000 lb., from Manlius, N. Y., to Solvay, N. Y., sixth class rate to apply. Reason—Investigation develops there has been no movement for some time, nor is there prospect for future shipments, therefore rate is obsolete.

25021. To provide for minimum weight of 60,000 lb. on **stone chips or granules** (roofing granules), when loaded in box cars, from Advance, Penn., Baltimore, Md., Chairman, Deerfield, Fairfield, Gladhill and Maria Furnace, Penn., to points of destination as shown in Western Maryland Ry., I. C. C. No. 8070.

25022. To increase rate of 75c to 83c per net ton on **stone, natural** (other than bituminous asphalt rock), **crushed**, carloads (See Note 2), from LeRoy, N. Y., to Chili, N. Y. Reason—Investigation develops that there is no present movement from LeRoy, N. Y., to Chili, N. Y., in view of the fact that the present rate is low for the miles involved, and it is the desire to increase it to the proper basis.

25026. **Sand**, carloads (See Note 2), from Palmerton, Penn., Stewarts, Switchback and Quakake, Penn., $1 per net ton. (Present rate $1.10 per net ton.) Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

M-1569. **Stone, natural** (other than bituminous asphalt rock), **crushed**, carloads, minimum weight when in regular equipment 90% of marked capacity of car, when in container cars minimum weight 110,000 lb. will apply, from New Hamburg, N. Y., to Cold Spring, N. Y., 75c, and Port Morris, N. Y., 85c per net ton. Reason—Proposed rate compares favorably with rate from New Hamburg to Melrose Junction and Mt. Vernon, N. Y.

M-1570. **Gypsum blocks**, carloads, when loaded by shippers in steel crates, minimum weight 40,000 lb., from Gibsons Point, Penn., to New York (Bronx Terminal), N. Y., and Jersey City (Jersey Ave.), N. J., 12½c per 100 lb.

Crates detained by consignees or authorized representatives in excess of 24 hours will be charged for at the rate of 25c per day or fraction thereof. Reason—Proposed rate and minimum carload weight is same as now in effect on gypsum blocks from and to same points when loaded in open-top or box cars.

25033. **Crushed stone**, covered with oil, tar or asphaltum, carloads (See Note 2), from North LeRoy, N. Y., to Watkins Glen, N. Y., $1.50 per net ton. Present rate, 19c per 100 lb., sixth class. Reason—Proposed rate is comparable with rates on like commodities, for like distances, services and conditions.

25036. **Sand, building or filling and gravel**, carloads (See Note 2), but not less than 72,000 lb., from Pittsburgh, Penn., to Westernport, Md., $1.30 per net ton. Present rate, $1.40 per net ton. Reason—Proposed rate is comparable with rates to Keyser and West Virginia Central Jct., W. Va.

25037. To cancel commodity rates on **gypsum and gypsum rock**, from Clarence and Fayetteville, N. Y., to B. & A. R. R., C. N. J., D. & H. R. R., D. L. & W. R. R., L. V. R. R., L. & N. E. R. R., N. & B. R. R., P. R. R., Rdg. Co. and W. Md. Ry. Class rates to apply. Reason—Investigation develops no shipments have moved for

some time, nor is there prospect for future shipments, therefore rates are obsolete.

25040. **Fire and ganister stone,** carloads (See Note 2), from Granville, Penn., to Ardenheim, Penn., and Burnham, Penn., to Reedsville, Penn., incl., and Lewistown, Penn., to Bellaire, O., Bridgeport, O., Ellwood City, Penn., Farrell, Penn., Girard, O., Greenville, Penn., Haselton, O., Lowellville, O., Mingo Jct., O., New Castle, Penn., Niles, O., Sharon, Penn., Sharpsville, Penn., Shenango, Penn., Steubenville, O., Struthers, O., Toronto, O., Warren, O., Washington, Penn., Weirton, W. Va., West Middlesex, Penn., Wheatland, Penn., Wheeling, W. Va., Youngstown, O., and Martins Ferry, O., $1.90 per net ton. Reason—Proposed rate is comparable with rates from Huntingdon and Warrior Ridge, Penn.

25046. **Sand (blast, engine, fire, foundry, glass molding and silica),** carloads (See Note 2), from Santa Clara, N. Y., to Erie, Penn., $3.53 per net ton. (Present rate, $3.70 per net ton.) Reason—Proposed rate is comparable with rates from West Chazy, N. Y., to Fredonia, N. Y., Rouses Point to Dunkirk, N. Y., and Plattsburg to Falconer, N. Y.

25051. To cancel commodity rate of 65c per gross ton on **refuse stone screenings,** mixed with clay and dirt, carloads (See Note 1), but not less than 88,000 lb., from Cambria, N. Y., to East Buffalo, Buffalo Stations and Black Rock, N. Y., sixth class to apply. Reason—Investigation develops there will be no further movement, therefore rate is obsolete.

25056. **Sand, blast, engine, fire, foundry, glass, molding and silica,** carloads (See Note 2), from Crescent, Niskayuna, West Albany, Karner, Schenectady, Selkirk, Wemple, Glenmont, Albany, Fullers and South Schenectady, N. Y., to Fayetteville and Manlius, N. Y., $1.70 per net ton. (Present rate $1.80 per net ton.) Reason—Proposed rate is comparable with rates from points in Albany district on the B. & M. R. R. to Manlius, N. Y.

24796, Sup. 1. Amend Rate Proposal No. 24796, covering **plaster, plasterboard and lime,** carloads, from Akron, Batavia, Clarence Centre, Transit, Oakfield and Wheatville, N. Y., to N. & W. Ry. stations by adding Philadelphia, Chester-Marcus Hook, Penn., as points of origin, subject to same rates as proposed from Akron, N. Y.

25066. **Crushed stone,** carloads (See Note 2), from Port Richmond (Philadelphia), Penn., to Goshen, N. J., $1.20 per net ton. Present rate, $1.25 per net ton. Reason—Proposed rate is comparable with rate on gravel from Farmingdale, N. J., to Goshen, N. J.

25069. **Slag, crude or crushed,** in bulk, carloads (See Note 2), from Birdsboro, Penn., to West Chester, Penn., 80c per net ton. Present rate, 90c per net ton. Reason—Proposed rate is comparable with rate from Birdsboro to Ardmore and Devon, Penn.

25070. **Sand and gravel,** other than blast, engine, foundry, glass, molding or silica, carloads (See Note 2), from Otisville, N. Y., to New Hampton, N. Y., 60c per net ton. Present rate, 75c per net ton. Reason—Proposed rate is comparable with rates from Mahwah, N. J., to Nanuet, Aden and Pearl River, N. Y.

25071. To increase rate of $1 to $1.10 per net ton applying on **sand,** in open top cars, without tarpaulin or other protective covering, carloads (See Note 2), from Mapleton District, Penn., to Sterling Colliery No. 1, 2 and 6, Penn. Reason—Proposed rate is in error and it is desired to place same on the proper basis so as to conform with Public Service Commission Order in P. S. C. Penn. Docket No. 7950, i. e., 81 to 100 miles, inclusive.

25079. **Slag, crude or crushed,** in bulk, carloads (See Note 2), from Ridgewod, Penn., to North Reading, Penn., inclusive, to Princeton, W. Va., $5.30 per net ton. (Present rate, $6.65 per net ton.) Reason—Proposed rate is comparable with rate to Bluefield, W. Va.

25084. **Ground marl,** carloads, minimum weight 50,000 lb., from Alba Marl Lime Co., W. Va., Charles-Town, W. Va., Cornwell Lime Marl Co.'s Siding, Natural Lime Marl Co.'s Siding, W. Va., and Winchester, Va., to Canisteo, Bennetts, Greenwood, Rexville, Barney Mills, McGraws, Whitesville, Culver, Paynesville, N. Y., Genesee, Ellisburg, Andrews Settlement, Rose Lake, Woodville, Oswayo, Coneville, Clara, Millport, Sharon Center, Shingle House and Myrtle, Penn., 17c per 100 lb. (Present rate, combination.) Reason — Proposed rate is comparable with rates on agricultural lime between same points.

25087. To increase rate of $1.10 to $1.20 per net ton on **crushed stone,** carloads (See Note 2), from LeRoy, N. Y., to Elmira, Elmira Heights, N. Y. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

25089. **Slag, crude or crushed,** carloads (See Note 2), from Birdsboro, Penn., to New Boston Junction, Penn., 90c per net ton. Present rate, $1.15 per net ton. Reason—Proposed rate is comparable with rate from Birdsboro to Lytle, Penn., and from Pottstown, Penn., to Minersville, Tamaqua, Penn., etc.

25096. **Agricultural lime** (having no commercial value for chemical or building purposes), minimum weight 30,000 lb., from Pancoast, Penn., to Port Allegany, Penn., 9½c per 100 lb. (Present rate, 17½c per 100 lb., 6th class.) Reason—Proposed rate is comparable with rates from Pancoast to Emporium, Warren, Irvineton and Union City, Penn.

25102. **Sand,** carloads. (A) In open top cars. (B) In box cars or closed equipment.

From Toms River, N. J.

To	Proposed rate (A)	(B)
Temple, Penn.	200	225
Minersville, Penn.	260	285
Port Carbon, Penn.	260	285
St. Clair, Penn.	270	290
Tamaqua, Penn.	270	290
Excelsior, Penn.	270	290
Shamokin, Penn.	270	290
Natalie, Penn.	270	290

Present rates—Sixth class.

Proposed rates in cents per 2000 lb.

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions within this same general territory.

25103. **Limestone, unburnt, ground or pulverized,** carloads, minimum weight 60,000 lb., from Frederick, Grove, Md., Martinsburg, Millville, W. Va., Stephens City, Va., Engle, W. Va., Strasburg and Strasburg Junction, Va., and Security, Md., to all points in Somerset County, Penn., located on the B. & O. R. R.

Representative points in Pennsylvania

	Pres.	Prop.		Pres.	Prop.
Meyersdale	$1.80	$1.60	Somerset	1.80	1.70
W. Salisbury	1.80	1.60	Boswell	1.80	1.80
Garrett	1.80	1.60	Steyestown	1.80	1.80
Berlin	1.80	1.70	Casselman	1.80	1.70
Rockwood	1.80	1.60	Confluence	1.80	1.70

Rates in cents per net ton.

Reason—It is proposed to apply Docket 7588 scale to all points in Somerset County, Penn., located on the B. & O. R. R., per Index Nos. 6675, Williams, Penn., to 7410, Unamis, Penn., except 7325, Johnstown, Penn., from all points shown above (representing actual producing points of unburnt, ground or pulverized limestone), per B. & O. R. R. I. C. C. 21047. It is further proposed to cancel all rates on this commodity from all producing points other than shown above to all destinations shown in B. & O. R. R. I. C. C. 21047 and B. & O. R. R. I. C. C. 20734, the latter tariff publishing rates to points on the P. R. R. and lateral lines. The above points of destination are representative of the territory to which the proposed adjustment will apply.

25106. **Crushed stone, coated with oil, tar or asphaltum** (amiesite), carloads (See Note 2), from Snowflake, W. Va., to Fleetwood, N. C., $2.90 per net ton. Present rate, combination. Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

25111. **Crushed stone,** carloads (See Note 2), from Crovania, Penn.

To Pennsylvania points

	Rate		Rate
Mahanoy City	90	Beaver Valley	70
Girardville	105	Mainville	65
Ashland	105	Catawissa	60
Shamokin	90	Bloomsburg	60
Shenandoah	105	Orangeville	70
Mt. Carmel	105	Benton	75
Trevorton	105	Danville	60
Otto	115	Mooresburg	70
Herndon	115	Milton	70
Arters	80	Allenwood	75
Sunbury	80	Muncy	80
Lewisburg	75	Montoursville	85
Lofty	80	Newberry	90
Krebs	75		

Rates in cents per 2000 lb.

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

25122. **Stone, natural** (other than bituminous asphalt rock), **crushed, coated with oil, tar or asphaltum,** carloads (See Note 2), from South Bethlehem, N. Y., to Solon and East Freetown, N. Y., $2 per net ton. (Present rate, 21c per 100 lb.) Reason—Proposed rate is comparable with rates from South Bethlehem, N. Y., to Whitney Point, Vestal, N. Y., etc.

25127. **Cement,** carloads, to stations on the Ulster & Delaware R. R., West Hurley, N. Y., to Hunter, N. Y., inclusive, from Alsen, N. Y., rates ranging from 10 cents to 15½c per 100 lb.; from Binnewater, N. Y., rates ranging from 8c to 13½c per 100 lb. Reason—Proposed rates are comparable with rates from Hudson, N. Y.

25128. **Gravel and sand,** N. O. I. B. N., in open cars, except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), to Erie R. R. points, Corning, Elmira, Waverly, Owego, Endicott, N. Y., Great Bend, Susquehanna, Thompson, Carbondale, Penn., Gulf Summit, Hancock, Long Eddy, Cochecton, Narrowsburg, N. Y., and various, from Chenango Bridge, N. Y., rates ranging from 80c to $1.30 per net ton; from Whitney Point, N. Y., rates ranging from 90c to $1.40 per net ton and from Sherburne, rates ranging from $1.10 to $1.50 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions, also comparable with rates on crushed stone from Jamesville, N. Y.

25135. **Sand, blast, engine, foundry, molding, glass, silica, quartz or silex,** carloads (See Note 2), from Tatesville, Penn., to Troy, N. Y., $3.90 per net ton. (Present rate, 27½c per 100 lb., sixth class.) Reason—Proposed rate is comparable with rate from Mapleton district to Troy, N. Y.

25139. **Sand, blast, engine, foundry, molding, glass, silica, quartz or silex,** carloads (See Note 2), from Tatesville, Penn., to Brownsville and Republic, Penn., $2.10 per net ton. (Present rate, $2.52 per net ton.) Reason—Proposed rate is comparable with rates from Mapleton District, Penn.

25142. **Sand, gravel and crushed stone,** carloads (See Note 2), to Hardys, N. Y., from Le Roy, N. Y., 80c; Machias, N. Y., 70c, and Springville, N. Y., 90c per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

25143. **Sand,** carloads. (A) In open top cars. (B) In box cars or closed equipment (See Note 2), from Toms River, N. J.

	Proposed (A)	(B)	Present (A)	(B)
Green Ridge, Penn.	270	290	305	340
Olyphant, Penn.	290	310	305	340
Peckville, Jessup, Penn.	290	310	305	340
Carbondale, Penn.	290	310	305	340

The above rates in cents per 2000 lb.

Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

25144. **Sand,** carloads (See Note 2), from Toms River, South Pemberton and Birmingham, N. J., to Ship Bottom, N. J., $1.27 per net ton. Reason—To meet motor truck competition.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

21060. **Core and molding sand** (See Note 3), from Lynn, Mass., to Everett, Mass. Present—10. Proposed—90c per net ton. **Reason—To meet barge competition.**

WESTERN TRUNK LINE DOCKET

2556-S. **Sand and gravel,** carloads, from Ottawa, Ill., to points in Minnesota, taking Groups 18 and 19 basis of rates under Item 2020 of W. T. L. Tariff 50-N. Rates: Present, $2.40 per net ton; proposed, $2.15 per net ton.

7428. **Sand,** from Milwaukee, Wis., to Missouri river points covered by Boyd's 1-S. Rates—Present, class E; proposed, 15½c.

2556-T. **Sand and gravel,** from Browntown, Wis., to points in Illinois shown in Items 4266 to 4279, inclusive, of C. M. St. P. & P. Tariff 9805-K. Rates—Present, combination of locals; proposed, 30c over present rates from Beloit, Wis., as shown in the above mentioned items.

5319-C. **Sand, gravel and stone,** carloads, as described in Western Trunk Line Tariff 175, from points in Nebraska to points in Nebraska, joint line. Description: Present—Nebraska joint line scale applicable on gravel, sand, stone, crushed or pulverized. Proposed—Substitute for the present description of W. T. L. Tariff 175, the following: Gravel, rubble stone (rough, broken, irregular pieces, not machined or tooled); sand, stone (crushed, chip, dust, pulverized, rip rap).

7415, Sup. 1. **Sand,** carloads (See Note 2), but not less than 40,000 lb., from Utica, Ill., to St. Paul (Fordson), Minn. Rates: Present—$2.40 per net ton. Proposed—$2.15 per net ton.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4574. **Sand blast, engine, foundry, glass or molding,** carloads (See Note 1), from Bowes, Ill. Rates per net ton.

To	Present	Prop.
Champaign, Ill.	Class rates	$1.76
Springfield, Ill.	Class rates	1.76
Madison, Wis.	Class rates	1.40
Waukesha, Wis.	Class rates	1.40

5913. **Agricultural screenings or dust** (fertilizer limestone), carloads, from Falling Springs, Ill., to points in I. R. C. territory. Rates per ton of 2000 lb.:

To (Representative points)	Pres.	Prop.
Clores, Ill.	200	70
Percy, Ill.	190	70
Jamestown, Ill.	190	80
Scheller, Ill.	210	90
Mt. Vernon, Ill.	200	90

5924. **Sand and gravel,** except blast, engine, foundry, glass or molding, carloads, from Golconda, Ill., to Mt. Vernon, Ill. Rates per net ton. Present—Combination. Proposed—$1 via I. C., Tamaroa, Mo. Pac.; $1.20 via I. C., Centralia, Sou.; $1.13 via I. C., Ashley, L. & N.; $1 via I. C., Marion, C. & E. I.

5926. **Sand and gravel,** carloads, from Browntown, Wis., to stations on connecting lines in Illinois.

To representative points in Illinois

	Pres.	Prop.		Pres.	Prop.
Addison	*	1.28	Kewanee	*	1.61
Bloomington	*	1.68	Mundelein	*	1.35
Downers Grove	*	1.48	Zearing	*	1.61
			Watage	*	1.73

*Combination of locals

Sand, Gravel and Stone Rates in South Carolina Found Unjust

WHEN THE Interstate Commerce Commission made public on September 30 a report from Examiner E. P. Hurley holding that rates maintained on sand, gravel and crushed stone in South Carolina were found to be unjust, and discriminatory against interstate commerce, it touched upon an important matter for the state highway department. Rates recommended would remove this discrimination and it was also held that interstate rates from Hellams to points on the Piedmont and Northern railway were found not unjustly discriminatory against interstate commerce.

The report, in part, follows:

"The commission instituted this proceeding on application of the Atlantic Coast Line, the Seaboard Air Line, the Southern and 10 short carriers operating in South Carolina to determine whether present carload rates on sand, gravel and stone required by the railroad commission of South Carolina order of August 24, 1928, to be maintained by petitioners for intrastate movements between points in the state of South Carolina result in any undue or unreasonable advantage, preference or prejudice as between persons and localities intrastate commerce, on the one hand, and interstate or foreign commerce, on the other, or in any undue, unreasonable or unjust discrimination against interstate or foreign commerce; and if any, what rates shall be prescribed to be charged by the petitioners in order to remove such advantage or discrimination as may be found to exist. All railroads operating in the state of South Carolina subject to this commission's jurisdiction were made respondents in these proceedings, and the governor of South Carolina and the railroad commission of South Carolina were given due notice.

"At the opening of the hearing, counsel for the railroad commission of South Carolina challenged the jurisdiction of this commission, under the issues in this case as stated at the hearing, the correctness of which was not questioned, over the intrastate rates involved. Such contention is wholly without merit.

"The transportation bureau of the chamber of commerce of Spartanburg, the Charleston traffic bureau and the Greenville traffic associations appeared and testified in support of the present South Carolina basis of rates, as did two South Carolina producers and shippers.

"The Atlantic Coast Line, the Southern railway and the Seaboard Air Line, trunkline parties to the petition which resulted in the order of investigation, respectively, assumed the burden of attempting to show that the present rates prescribed by the South Carolina commission are too low, and a burden on interstate commerce."—*Columbia* (S. C.) *State.*

Seek to Establish Lower Rates on Cement from Gold Hill, Ore.

OREGON Public Service Commission has been requested by the Southern Pacific, Oregon-Washington Railroad and Navigation Co. and the Spokane, Portland and Seattle Railway to grant authority to publish lower than normal rates on cement from Gold Hill, Ore., to points at which Gold Hill cement is competitive with cement carried to Portland by water. The presentation for the three railroads was made by Paul P. Farrens, attorney for the Southern Pacific.

The points effected are chiefly those on the Union Pacific lines as far east as Celilo and those down the Columbia river from Portland to which cement brought from foreign countries and California by ships is distributed through the port of Portland.

The application and hearing were necessitated by the state law similar to section 4 of the Interstate Commerce act, which forbids publication of a lower rate for a short haul than for a long haul over the same line. Authority to name a lower rate from Gold Hill to Portland to intermediate points was granted by the Oregon commission several years ago with the result that the rate to Portland on Gold Hill cement is 12 cents, while it ranges as high as 21 cents to intermediate points.

The authority sought by the railroads is to continue the 12-cent rate to Portland in conjunction with local rates from other points on the level of 1923 as joint through rates, disregarding a recent increase in rates made by the Oregon Railway and Navigation Co. The application has been taken under advisement by the commission.

Illinois Producer Granted Reduction in Gravel Rates

THE CENTRAL FREIGHT BUREAU has secured a decision of the Illinois Commerce Commission in the case of the Terry and Lewis Sand and Gravel Co., Galesburg, Ill., vs. the A. T. & S. F. Ry. Co., the C., B. & Q. R. R. Co., the T. P. and W. R. R. Co. and the M. & St. L. R. R. Co., which has brought about a reduction in the sand and gravel rates from Gladstone, Ill., where the pits of the Galesburg firm are located, to various points in Illinois.

The new lower rates will now permit the shipper to enter markets located on lines beyond those of the originating carrier, the C., B. & Q., which had hitherto been closed on account of the rate situation.

To give an example, the rate from Gladstone to Princeville, Ill., formerly $1.80 per ton, is now $1.10, which latter rate now enables the shipper to enter Princeville in competition with other producers. Similarly with a large number of other consuming points, the shipper is able to market his products where it is alleged he could not enter before on account of the freight rate adjustment.—*Galesburg* (Ill.) *Mail.*

I. C. C. Proposed Reports

18693, 18909, 16339, and 19311. Gypsum Plaster. A recommendation that the commission find unreasonably low the rates on plaster from interior mills located in Utah, Montana, Wyoming and Nevada to the Pacific Northwest and that a minimum rate be prescribed has been made by Examiner Robert S. Simons in No. 18693, Standard Gypsum Co. vs. Union Pacific et al., No. 18909, Pacific Portland Cement Co., Consolidated, vs. Western Pacific et al., No. 16339, Three Forks Portland Cement Co. vs. C. M. & St. P. et al., and No. 19311, Standard Gypsum Co. vs. Southern Pacific et al. The rate proposed for condemnation is 25 cents. Examiner Simons recommends the prescription of a rate of 30 cents.

In addition the examiner recommends that the commission find unduly prejudicial to Gerlach, Nev., the rates on plaster from Hanover and Heath (Gypsum), Mont., to Astoria, Longview, Raymond, Olympia, Seattle, Bellingham and Vancouver, Wash. He said the commission should find those rates unduly preferential of Hanover and Heath to the extent they were less than those contemporaneously in effect from Gerlach to the points in Washington hereinbefore mentioned. The rates are based upon a minimum of 80,000 lb.

23412. Roofing Slag. Farber Sheet Metal and Roofing Co. vs. New Haven et al. and a sub-number, J. T. Maguire Co. vs. Same. Examiner J. G. Cooper recommends that the rates on roofing slag from Reading, Hokendaqua, Swedeland and Bethlehem, Penn., to Pawtucket, East Greenwich and Rumford, R. I., and Sterling, Conn., be found unreasonable to the extent they exceeded or may exceed the rates prescribed from the same points of origin to destinations in the same vicinity in Cartier and Sons Co. vs. New Haven, 157 I. C. C. 649, plus, as in that case, 70 cents a net ton for a car-float or lighterage service in New York harbor. Reparation proposed. For reparation purposes on shipments routed by the shipper, Mr. Cooper said, the rates should be calculated on distances over routes of movement. For the future, he said, rates should be made over routes composed of not more than three line-haul carriers via existing connections which would result in the lowest rates. Rates in the Cartier case were based on a scale beginning with 150 cents for the initial block between 100 and 125 miles. For the block between 200 and 230 miles the rate there prescribed was 200 cents and for the block between 320 and 350 miles, the maximum distance, 250 cents.

23097. Glass Sand Rates. Examiner T. Leo Haden in No. 23097, Glenshaw Glass Co. Inc. et al. vs. B. & O. et al., has found the rates on glass sand from points in the Berkeley Springs, W. Va., and Hancock, Md., districts to destinations in the Pittsburgh group in Pennsylvania, unreasonable to the extent they exceeded $1.95 a net ton. Reparation proposed.

I. C. C. Decision

23239. Roofing Slag. Nonpareil Roofing Co. vs. New Haven et al. The Interstate Commerce Commission, by division 5, has found the rates on roofing slag from Bethlehem and Hokendauqua, Penn., to Bridgeport and Stratford, Conn., unreasonable to the extent they exceeded $2 a net ton on a shipment moving via Maybrook, N. Y.; $2.45 on shipments moving via Jersey City, N. J., and Harlem River, N. Y., and $2.30 on the others moving via Harlem River. Reparation has been awarded.

Industrial Sand Cases 1930

HEARING in the following entitled cases now assigned for November 21, 1930, at Chicago, Ill., is cancelled, and these cases reassigned for hearing January 13, 1931, 10 o'clock a. m., standard time, at the Hotel Sherman, Chicago, Ill., before Examiner Fuller:

Dockets Nos. 22907, 23377, 21091, 17817 Sub. 1, 15833, 17822, 16296, 16250, 17060, 17272, 17272 Sub. 1, 17272 Sub. 2, 17338, 22098, 20554, 22476, 23111, 23111 Sub. 1, 18725, 18725 Sub. 1, 18718, 19978, 23340, 22338, 23245, 23226, 23446, 23560, 19743, 20803, 22053, 21849, 21486, 21553, 20733, 21133, 21133 Sub. 1, 20828, 22289, 21383, 21136, 21396, 20230, 21618, 23575, 17422, 23796, 23889, 23897, 23930, 23936, 23912 and 23226 Sub. 1.

Program of Asphalt Paving Conference

THE PROGRAM of the ninth annual Asphalt Paving Conference, Peabody hotel, Memphis, Tenn., December 1-4, incl., is announced as follows:

TUESDAY, DECEMBER 2—FIRST SESSION
10 A. M.

Chairman, Leroy M. Law, President, the Asphalt Institute

Addresses:
Hon. Henry H. Horton, Governor of Tennessee.
Hon. Watkins Overton, Mayor of Memphis.
Leroy M. Law, President, the Asphalt Institute.
Prevost Hubbard, President, the Association of Asphalt Paving Technologists.

"Co-ordination of Rail and Highway Transportation." R. H. Aishton, President, American Railway Association, and Chairman, Association of Railway Executives.

"Making Every Farmer's Gate His Shipping Point." Norman M. Blaney, Director, Farm-to-Market Roads, American Farm Bureau Federation.

"Local Road Improvement in Canada." Homer P. Keith, chief maintenance engineer of Alberta Province, Canada.

SECOND SESSION, 2 P. M.

Chairman, R. H. Baker, State Highway Commissioner of Tennessee

"Adapting a State Highway System to Local Conditions." J. J. Forrer, state maintenance engineer, Virginia Highway Department.
Discussion.

"Simplified Specifications for Asphaltic Materials." E. F. Kelley, Chief of Research, U. S. Bureau of Public Roads.
Discussion.

Survey Report of Stage or Progressive Construction Committee:
Charles E. Grubb, engineer-executive, County Highway Officials' Division, American Road Builders Association.
B. P. McWhorter, state highway engineer, Georgia Highway Department.
T. C. McEwen, chief engineer, Tennessee State Highway Department.
Fred H. Shepherd, engineer of maintenance, Queens Borough, New York City.
Charles S. Christian, state highway engineer, Arkansas Highway Department.
Discussion.

"Economic Thickness of Foundation and Wearing Course." Roy M. Green, manager, Western Laboratories, Lincoln, Neb.

WEDNESDAY, DECEMBER 3—THIRD SESSION, 9:30 A. M.

(Chairman to be selected)

Survey Report of Resurfacing Committee:
Frank L. Raschig, first assistant director, Ohio State Department of Highways.
Col. Jacob L. Bauer, state highway engineer, New Jersey Highway Department.
Clarence A. Proctor, consulting engineer, Michigan Laboratories, Inc., Detroit, Mich.
Discussion.

Survey Report of Pavement-Widening or Traveled-Way Committee:
B. E. Gray, highway engineer, the Asphalt Institute, New York, N. Y.
Daniel Soule, maintenance engineer, State Board of Public Roads of Rhode Island.
Discussion.

Survey Report of Maintenance Methods Committee:
Major F. M. Davison, maintenance engineer, District of Columbia Highway Department, Washington, D. C.
J. B. Early, maintenance engineer, State Highway Department of Texas.
C. E. Myers, director of transit, Philadelphia, Penn.
W. E. Duckett, county highway engineer, Hennepin County, Minneapolis, Minn.
George H. Delano, state maintenance engineer, Massachusetts Department of Public Works.
Discussion.

FOURTH SESSION, 2 P. M.

Chairman, Charles H. Moorefield, State Highway Engineer, South Carolina Highway Department

"The Mixed-in-Place Method." J. T. Pauls, senior highway engineer, United States Bureau of Public Roads, Washington, D. C.
Discussion: Opened by Z. E. Sevison, state highway engineer of Wyoming.

"The Use of Asphaltic Materials":
(a) For Mat or Carpet Coat. H. C. Weathers, testing engineer, State Road Department, Florida.
(b) For Mixed-in-Place Construction. H. J. Spelman, chief engineer, State Road Commission of West Virginia.
(c) For Cold Pre-Mix Types. C. A. Mullen, paving department, Milton Hersey Co., Ltd., Montreal, Que., Canada.
(d) For Joint and Crack Filler. Clarence D. Pollock, consulting engineer, New York, N. Y.
Discussion.

"Sand Asphalt Pavements":
W. E. Hawkins, construction engineer, North Carolina State Highway Department.
H. C. Holden, district engineer, Department of Public Works of Massachusetts.
Discussion.

THURSDAY, DECEMBER 4—FIFTH SESSION, 9:30 A. M.

(Chairman to be selected)

Survey Report of the Airport Paving and Surfacing Committee:
William N. Carey, chief engineer, Department of Public Works, St. Paul, Minn.
P. J. Freeman, chief engineer, Bureau of Tests and Specifications, Allegheny County, Penn.
Mark R. Thompson, engineer of bituminous pavements, Board of Public Service, St. Louis, Mo.
Col. R. Keith Compton, Director of Public Works, Richmond, Va.
Discussion: Opened by Col. John H. Jouett, manager, Aviation Department, Standard Oil Co. of Louisiana, and A. T. Hague, engineer, Asphalt Sales Department, Standard Oil Co. of Indiana.

"An Aviator's Conception of Adequate Airport Surfacings." Capt. Frank M. Hawks, superintendent of aviation, the Texas Co., New York, N. Y.

SIXTH SESSION, 2 P. M.

(Conducted by the Association of Asphalt Paving Technologists)

Chairman, Prevost Hubbard, President, the Association of Asphalt Paving Technologists

"Hot and Cold Asphalt Toppings for Gravel Roads." C. R. Stokes, materials engineer, Wisconsin State Highway Commission, Madison, Wis.
Discussion.

"Factors Governing the Stability of Asphaltic Limestone Pavements." J. H. Conzelman, Alabama Rock Asphalt, Inc., Birmingham, Ala.
Discussion.

Preliminary Report on Investigation of Causes of Cracking in Sheet Asphalt. F. J. Leduc, chief, Municipal Laboratory for Testing Materials, Montreal, Que., Canada.
Discussion.

Report of Committee on Pavement Guarantees. Roger L. Morrison, chairman, University of Michigan, Ann Arbor, Mich.
Discussion.

ENTERTAINMENT PROGRAM

General Chairman, W. B. Fowler, City Engineer.
Chairman, Ladies' Committee, Mrs. W. B. Fowler, Memphis, Tenn.

Monday, December 1—8 p. m.. Informal reception and dance, Hotel Peabody.
Tuesday, December 2—2 p. m. Bridge-tea for ladies at Country Club.
Tuesday, December 2—9 p. m. Supper and dance with novel miniature race track feature, Hotel Peabody.
Wednesday, December 3—7:30 p. m. Dinner and dance with especially staged cotton plantation singing and dancing act, Hotel Peabody.
Thursday, December 4—10 p. m. Entertainment at Silver Slipper Night Club, Memphis.
Friday, December 5—9 a. m. Golf tournament at Country Club.

Riverside Cement To Build New Silos

ANNOUNCEMENT was made recently by Earle MacDonald, general superintendent of the Riverside Cement Co., that operation of the production departments of the Crestmore, Calif., plant will be suspended during December. Shipments of cement will continue as usual during December, Mr. MacDonald said, as there are large quantities of cement in storage at the plant. In shipping out this cement the operation of the packing, sack-handling and shipping departments will be unchanged.

Mr. MacDonald stated that this short suspension of work in the production departments will materially facilitate the construction of additional new silos and other improvement work.—*Riverside* (Calif.) *Enterprise.*

Local Producers Win Washington State Fight Against Canadian Gravel

THE CONTROVERSY over whether British Columbia gravel would be used in the two government buildings at Blaine, Wash., or not, was amicably settled when an agreement was reached between Wilder & Montfort and Johnson Bros., the contractors, to use local gravel furnished by the Blaine firm. It is said that there were concessions on both sides.

The local firm will furnish in all from their local pit 3000 yd. of gravel, 2000 yd. of which are to be washed. The other 1000 yd. are to be used in surfacing the grounds.

Wilder & Montfort will proceed at once to install equipment at the pit for getting out the gravel and build bunkers for washing the gravel down town. This work will be finished in a short time. The contractors are prepared to pour concrete at the Pacific Highway building site for the foundation just as soon as steel and gravel are ready.

In this connection it is well to correct a false impression made by one of the contractors when he stated in Bellingham last week that the Blaine city council had "jumped" wharfage rates on gravel from 5 to 10 cents per yd. in order to bar foreign gravel. This is not true. The 5 cent charge was set 20 years ago when Washington avenue was paved under a city contract and was never changed. Recently, when the matter was being discussed, the old rate was found. As the city has a new wharf which would be damaged considerably by moving gravel over it, the council made a rate of 50 cents a yard for wharfage in order to protect the city's interests only. Customary wharfage on gravel, it is said, is 50 cents per ton, considerably higher than 50 cents per yard. —*Blaine* (Wash.) *Journal-Press.*

Florida Concrete Products Men Protest Increase in Freight Rates

THE TAMPA TRAFFIC ASSOCIATION is co-operating with similar organizations throughout south Florida in opposing proposed increases in rates on sewer pipe, farm drain, flue lining and other clay, concrete and shale products, recently published by the carriers.

The proposed new rates, covering various points in the southwest, involve increases to Tampa and destinations in peninsula Florida. Originally scheduled to become effective October 25, the rates have been suspended on petitions filed by the Tampa Traffic Association and other groups.

J. H. Donnell, general manager of the association, will represent Tampa shippers at the rate hearing, which will be held before examiners of the Interstate Commerce Commission at Jacksonville, December 3.—*Tampa* (Fla.) *Tribune.*

How to Enforce Safety Rules*

By Howard Gray
Chief Engineer, Lehigh Portland Cement Co., Union Bridge, Md.

"THERE IS NOTHING under God's heaven that justifies your creation or your citizenship but this gospel—that the greatest thing to creating a life is to save a life," Charles E. Woodcock is reported having said. As this is true, we can look upon our meeting here as one of vast importance.

We are assembled to consider ways and means of saving the lives of our fellow-men. Wars, pestilence, famine and disease take their toll. Carelessness, indifference and ignorance carry annually thousands into eternity. But we are encouraged, today, because our efforts are not to destroy men's lives but to save them, not only for the good of the individual, but indirectly for the blessing of those who are dependent upon him for their daily food. May the results of our conference be far-reaching and be the means of much good is my earnest hope and confidence.

How to Enforce Safety Rules

If, as Mr. Woodcock has said, "The next greatest thing to creating a life is to save a life," does it not seem strange that we are compelled to use forceful methods, at times, to get men to protect and save their lives? My task is to offer a few suggestions for doing this. I shall suggest three methods and discuss each briefly: First, "Publish"; second, "Prevent", and third, "Penalize."

"Publish." This, of course, would mean ways and means of letting Bill know we are interested in his welfare. But before we can publish rules we must have the rules to publish. Therefore something must be said about rules.

When a rule is presented to a man or a body of men, the first question which arises in his or their minds is this, "Who made this rule?" The first essential, therefore, is the organization of a safety committee or council whose business shall be to form governing safety rules for the entire plant or departments as it may be advisable. Thus the rule will be published with authority.

There is a vast difference between a sign which reads, "No parking" and one which reads, "No Parking" and is signed "State Road Commission." So we may rest assured the same is true of rules appearing in the plant.

After the rules are formed, then they should be published. How? The first way is by printing. If there are great numbers of rules, relating to one department or many, a neat little booklet will be found necessary. The second way is by attractive metal signs carrying safety slogans and rules, kept clean at all times. The third is verbally, safety meetings, occasional conferences and the grasping of every opportunity for calling attention to the rule.

"Prevent" is our second word. R. N. Van Winkle in an article on Accident Prevention —Injuries and Their Treatment, says, "Accidents can be prevented. Prevention is the first step in protection." When endeavoring to save lives we should likewise be interested in the prevention as far as possible of death.

Safety Devices Essential

You are familiar with the story of the little town which refused to contribute to build a fence to prevent accidents at the top of a steep grade, but gladly built and supported a hospital at the foot of the hill to care for the injured. So we shall not enforce rules if the necessary devices for prevention are not provided.

It is needless for us to say in a meeting of this kind that every plant, large and small, should provide such devices for the prevention of accidents before they try to enforce safety rules and see also that provision for improvement of the same is made as occasion presents itself. So I say, we prevent accidents and deaths and help enforce our safety rules by providing the equipment for safety.

We have already mentioned how rules should be made by a governing or safety council or committee. Prevention is greatly promoted by the proper publicity of those rules. Rules, like bill-board advertisements, should be short as possible, clear, definite. They should be attractively printed in colors and on metal, if possible, and should be placed in the proper places. They should be kept clean and neat.

Rules Should Be Definite

Rules should be so worded that any employe understands them; they should not offer two meanings but only one, and should be so pointed as to place responsibility where it belongs, thus guarding against general application.

Louis A. DeBlois in his book on "Industrial Safety Organization," in a chapter on Safety Rules, calls attention to a common error in publishing general rules which are loosely worded and to which there are permitted exceptions that are not mentioned in the rule. Such a rule as "You are forbidden to oil moving machinery" in plants where oilers and power house attendants do so as a part of their regular duties is apt to be broken by some individual who draws no fine distinction between his own rights and the duties of others. A better wording would be, "Only regular oilers, engineers and repairmen are permitted to oil moving machinery," or "Shut down machinery before oiling."

Another striking illustration of rules being definite, a rule which reads, "Guards must be replaced before machines are operated," is poorly worded since it leaves the responsibility undefined. Two rules are necessary: "Guards must be replaced before machines are operated," and "Operators are forbidden to operate machines when guards are not in place."

The foremen should not disobey rules or take chances lest others see them and follow their example. In other words, my friends, let us take steps to see that every care is provided for safety so that if possible, most of our accidents shall be such as to show willful negligence on the part of the injured.

Fixing the Penalty

Our third word is "Penalize." I have already alluded to this by saying that we should do our utmost to make it impossible for a man to be injured unless he willfully disobeys a safety rule. This of course is the perfection toward which we strive. We are here today to study means of gaining steps toward that end. But when rules are disobeyed what shall we do? What shall be the penalty?

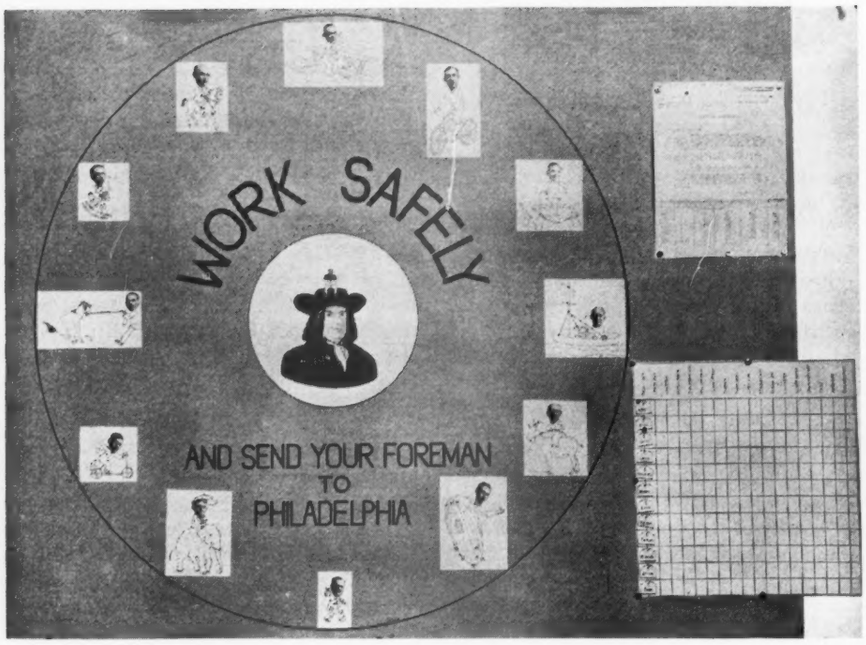
Again quoting from Mr. DeBlois, "Rigid, impartial, but not harsh enforcement of safety rules is an absolute essential. Judgment should not be hasty, action being delayed until all the facts are produced. Neither the length of service, the value, nor the position of the offender should be permitted to interfere with decisive action, taken in military parlance, 'for the good of the service,' to do otherwise will weaken the entire safety effort."

Where there is enforcement there must naturally be penalty. It should be one that will benefit the man himself and for the example that the penalty has upon the employes as a whole. Also, since we are interested in the subject of safety as a universal principle, we should consider whether dismissal will so benefit him that he will not commit the same offense in another plant.

Some men may be like the boy who is the leader of a gang, when you convert him to your will, he soon quits his, and perhaps you may be successful by placing a man who is careless and indifferent to safety rules, in a place where he can show results in obedience to said rules. Thus, as Mr. DeBlois says: "Judgment should not be hasty, and action should be delayed until all the facts are produced."

My suggestion therefore, for the enforcement of safety rules, would be, first, that we make sure that we have made an honest effort to provide such equipment as will insure the least number of accidents; second, that the proper steps be taken in organization and formation of rules and their enforcement by proper authority; and third, that these be so enforced that it will prove not only a benefit to the individual and to the plant where he is employed, but to the cause of safety everywhere.

*From a paper read at the regional meeting of the Portland Cement Association, Washington, D. C.



Unique bulletin board used by the American Lime and Stone Co., Bellefonte, Penn., to keep up the interest in an unusual safety contest

American Lime and Stone Co. Sponsors Unique Contest

THE American Lime and Stone Co., Bellefonte, Penn., a subsidiary of the Warner Co., Philadelphia, has started a safety contest which is unique in many ways. The 12 foremen have been entered in the contest and the one making the best safety record during the last four months of this year will receive as a prize a trip to Philadelphia, with all expenses paid. During this trip he will have the opportunity of visiting all of the Warner plants and will be entertained by the Warner personnel department. In case of a tie, both men will be sent to Philadelphia.

The contest will be determined by the severity rate which will be worked out each week. This will necessitate keeping an accurate record of the man-hours worked by the men under each foreman and also a record of days lost because of personal injuries. Weekly bulletins will be issued to all foremen and will be posted on the bulletin board.

The progress of the contest is indicated on the company bulletin board. This board shows the various foremen mounted on every kind of a transportation device from a kiddie-car to an airship, all speeding along on the way to Philadelphia. Sixteen towns on the way to Philadelphia are mentioned and the standing of each of the foremen is given as they pass through these towns.

Philadelphia is represented by a figure of Billy Penn and perched high atop the hat is seen the long, lean, gaunt figure of Ralph Dinsmore, who, representing the personnel department, is awaiting the arrival of the successful contestants.

At the time Personnel Manager Dinsmore sent us the picture of the bulletin board the contest had completed nine weeks without a single lost-time accident. "It begins to look as if we are going to have some 10 or 12 foremen to entertain in Philadelphia during the month of January," he writes.

Head Oiler Goes Twenty Years Without an Accident!

J. W. TALBERT, head oiler at the Dallas plant of the Lone Star Cement Co., Texas, celebrated a unique anniversary on September 27. That day completed Mr. Talbert's 20th year of service at the Dallas plant without an accident of any kind, major or minor. A 20-year record without a lost-time accident would have been an excellent one, but to work for that length of time without even a minor injury of any kind is really remarkable. Mr. Talbert's prescription for avoiding accidents is to "always be careful all day long and every day."

Mr. Talbert is 69 years old, having been born in southern Mississippi on August 14, 1861. At about the age of 12 he went to work in a woolen and cotton mill at Wesson, Miss. Just a little while after going to work there he poked his finger into a moving set of gears, with the result that his finger was badly cut. This incident gave him a wholesome respect for moving machinery, and probably accounts in some measure for the record he has made.

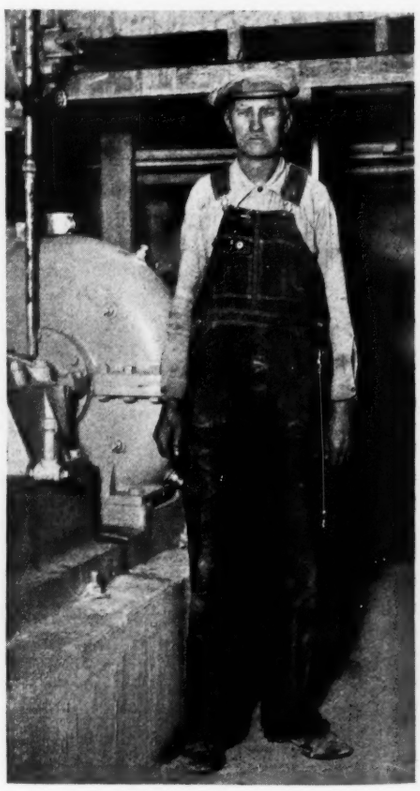
Early in the 90's the mill he was working for closed up, due to the panic throughout the country at that time, and Mr. Talbert moved to Dallas, securing employment at the old Arbuckle grain elevator that the old Dallas residents still remember. His work there was again with moving machinery, but the careful habits formed in Mississippi served him well and for something like 10 years he never had an accident.

The elevator was torn down to make way for the present Dallas passenger railway terminal, and Mr. Talbert then came to work for the Dallas cement plant, at first working in the power house for four years and was then transferred to the mill proper, where he has been working for 16 years. He has seen many changes in the machinery and methods of manufacture, but he says the greatest changes have been made along the lines of accident prevention. He is of the opinion that gear-guards, safety meetings, bulletins and other safety devices are all right, but that nothing can take the place of carefulness.

Mr. Talbert has raised a family of three children, one son and two daughters. He has seven grandchildren and one great-grandchild. He is now living in his own home, just north of the plant, although for the first few years of his service here he lived in one of the company houses in Cement City.

Like most safe workers, Mr. Talbert is a steady worker. In January, 1930, Mr. Talbert suffered from a siege of pneumonia, losing 42 days from his work, and this is practically all the time he has lost from his work during the entire 20 years at Dallas.

There is no doubt that Mr. Talbert has saved himself and his family much suffering by his habit of working safely. Perhaps his very life has been dependent on this habit, and if he had not been in the habit of working as he does, who can say he would not be numbered among those who have suffered permanent disability, or even death?



J. W. Talbert

No-Accident Record at Victorville, Calif., Cement Plant Gets a Set-Back

A SPECTACULAR ACCIDENT that cost the life of a Mexican employe on October 21 terminated the 600-day safety record of the Southwestern Portland Cement Co. plant in Victorville, Calif.

Jose Canarena plunged from a crane in the company's plant to a clinker pit 54 ft. below. Canarena, who apparently became dizzy and lost his footing on the lofty perch, was injured internally. He was rushed to the Victorville hospital, a short distance away, where he was placed under the care of Dr. F. W. McCorkle. Canarena died at 2 p. m., 2½ hours after the accident.

The accident was the first at the Victorville cement plant in nearly two years. For months the plant has been the proud possessor of a safety trophy that is coveted by cement plants. Employes, proud of this record, have taken extra precautions to continue the safety honor roll.—*Beaumont* (Tex.) *Journal.*

Stanley Owens Joins Portland Cement Association as Safety Engineer

UNPARALLELED INTEREST in the prevention of accidents, by members of the Portland Cement Association, has made it necessary to increase the present staff handling the association safety work, in preparation for the 1931 advance on cement mill and quarry mishaps. As an important step in the plan to cut still further the fast-dwindling record of personal injury accidents, Stanley Owens, who has been a safety engineer with the Bureau of Safety for several years, leaves his position with the bureau to become safety engineer with the Portland Cement Association on December 1.

Stanley Owens

Accident prevention work among the cement plants has become a well organized and highly technical activity. Consequently, Mr. Owens was selected for his variety of experience with the electric, gas, ice and electric railway utilities holding membership in the Bureau of Safety, the latter being regarded as one of the most successful organizations in the industrial safety field. Mr. Owens is a graduate of Armour Institute of Technology.

While the safety work of the association will continue under the general direction of A. J. R. Curtis, assistant to general manager, Mr. Owens will engage immediately in a study of recent accidents and an analysis of recent plant records, in preparation for a presentation of this subject to be made at the association's regional safety meetings next year.

New Jersey Quarry Has Blasting Accident

FOUR WORKMEN were seriously injured recently in a premature dynamite explosion at the plant of the Bound Brook Crushed Stone Co. at Chimney Rock, N. J., a mile and a half from Bound Brook. The injured men were William Haelig, plant superintendent and member of the Bound Brook borough council; Arthur Waldron and Michael Assanti, both of Martinsville, and Anthony Michael of Manville.—*New York* (N. Y.) *Herald-Tribune.*

Recent Gravel-Plant Accidents

ONE WORKMAN was killed and one was seriously injured October 16 at the sand and gravel pit of the Pioneer Sand and Gravel Co., of Seattle, Wash., at Steilacoom, Wash. The two men were poling down sand in a high bank and were buried in a slide. The one who was killed was buried head down. The other was rescued alive, but in a critical condition.

At Riverside, Ohio, October 23, three men were seriously injured at the Milligan Sand and Gravel Co. pit. A local news dispatch describes the accident as follows: "The men were at work under the shovel, when a cable caught on the apron of the machine, striking the three men below. One was partially buried under the gravel which was dumped from the overturned shovel when the cable caught, receiving severe lacerations about the head and face. Another was struck on the head, inflicting a bad cut, and the third was struck and injured in the back."

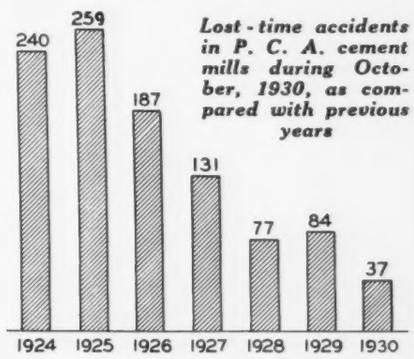
At Pomeroy, Ohio, a workman was injured October 20, at the pit of the West Virginia Sand and Gravel Co., when a piece of machinery fell on him.

October Accidents in the Cement Plants

WHILE THE GROSS NUMBER of accidents reported by the cement mills to the Portland Cement Association during October set a new low record for that month, the total included a distressing proportion of fatalities.

There were reported 33 lost time mishaps as against 73 similar accidents for October, 1929 and 77 for October, 1928. During October, 1930 there were four fatal accidents as against three fatals during October, 1929, and two during October, 1928. The drop in combined accidents—counting both lost time and fatal during the past several years is shown on the accompanying diagram.

Of the fatal accidents occurring during October, 1930, one took place in the burning department, two in the power department and one in the shops. In the first of these accidents, a carpenter helper was dropped from a scaffold on the side of a dust chamber building, 48 ft. from the ground. This occurred when the manipulation of a heavy load of brick on an elevator caused the scaffold to collapse. The elevator load fell to the ground, the victim landing on top. The fall resulted in a skull fracture from which the victim died four hours later. The victim was 20 years old and left a dependent mother.



Lost-time accidents in P. C. A. cement mills during October, 1930, as compared with previous years

In the first of the two power department accidents an oiler discovered a small fire in back of the switchboard and thoughtfully pulled the disconnect switch. The latter exploded, causing burns on face, arms and chest from which he died immediately. The victim was 34 years old, married, and had been with the company 11 years.

A water tender was washing up in engine room in basement when a steam line burst, throwing live steam which caused death by suffocation and scalding. He was 44 years old and had been employed by the company six years. He left a wife and daughter.

While assisting pipefitter in installing a temporary air line, a laborer fell from an electric crane structure. He suffered fractures of the pelvis and several ribs and severe hemorrhages and shock, causing his death a few hours later. He was 48 years old, had been employed by the company 11 years, and left a wife and ten children.

Foreign Abstracts and Patent Review

Calculation of Raw Mix for Cement Manufacture. A. B. Helbig calculates raw mix for 100 kg. (220 lb.) of clinker, on the assumption that there is no loss on ignition in the clinker and that only carbonic acid is expelled in making the clinker. By means of test burns and examination of strengths it was determined that for the raw material under consideration the raw mix must consist of x% $CaCO_3$ and $(100 - x)$% silicate. Since the carbonate of lime contains 56% caustic lime and 44% carbonic acid, which is expelled in cement burning, 100 kg. raw flour results in

$x \cdot 0.56 + (100 - x)$ kg. cement, or

$100 - 0.44 \cdot x$ kg. cement.

The raw flour required for 100 kg. cement is

$$\frac{100}{100 - 0.44 \cdot x}$$

from which the following table is derived:

Percentages of $CaCO_3$	74%	75%	76%	77%	78%	79%	80% in raw material
Kg. cement	67.88	67.44	67.0	66.56	66.12	65.68	64.8 for 100 kg. raw flour
Kg. raw flour	147.4	148.3	149.3	150.2	151.2	152.3	154.3 for 100 kg. cement

About 7% loss in dust is to be included when using a simple dust chamber, and 10% loss in dust is a safe figure in calculation.

If the raw material is prepared wet, the unit volume quantity of slurry contains a certain quantity by weight of water y and weighs z grams per liter, or kg. per cu. m.; the slurry contains furthermore $z - y$ grams m. per liter or kg. per cu. m. raw flour. In the assumption that the raw material is pulverized so far that for the weight of the individual granule its volume times the specific gravity can be substituted, the space which the raw material takes up in the water is

$$v = \frac{z - y}{s}$$

in which s represents the specific gravity, which is between 2.5 and 2.7 for the materials in consideration, and which can be accepted as 2.6 for a calculation.

The specific gravity of the raw material can be substituted, since eventually, in spite of the fine grinding, the pores present in the individual granules fill with water. Accordingly, in the quantity of space 1 there are y space units of water and $\frac{z - y}{s}$ space units of raw flour. Therefore

$$1 = y + \frac{z - y}{s}$$

$$s = y \cdot s + z \cdot - y$$

$$z = s - y\,(s - 1) \qquad (a)$$

The water content is usually given in percent. of weight, so that therefore

$$y = n \cdot z \qquad (b)$$

in which

$$n = \frac{\text{per cent. water}}{100}$$

If the latter value (b) is substituted in the above equation (a) then

$$z = s - n \cdot z\,(s - 1)$$

$$z = \frac{s}{1 + n\,(s - 1)}$$

$$1\,z = \frac{s}{1 + n\,(s - 1)}$$

By substituting for the value $s = 2.6$, in the formula the following table is calculated:

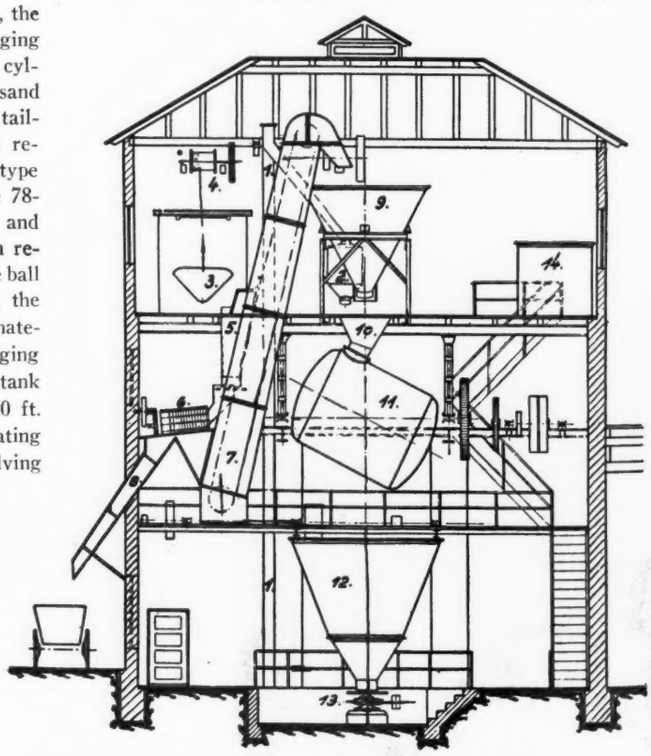
$$z = \frac{2.6}{1 + n \cdot 1.6}$$

Water % content	20	25	30	35	40	45	50	
n	0.2	0.25	0.5	0.35	0.4	0.45	0.5	
Weight z	1978	1857	1757	1667	1585	1511	1444	grm./1 kg./c.m.
Water y	395	464	527	583	634	680	722	grm./1 kg./c.m.
Dry substance	1583	1393	1230	1084	951	831	722	grm./1 kg./c.m.

—*Zement* (1930) **19**, 39, pp. 919-920.

The Thiessen Sand-Lime Brick Plant. The Thiessen sand-lime brick plant at Hamburg-Billstedt was built by J. Thiessen in a very compact design as shown in the accompanying sketch. The mixing plant shown here comprises the lime elevator 1, the lime scale 2, the sand skip 3, the lift 4, the sand charging spout 5, the adjustable cylindrical screen 6, the sand elevator 7, the screen tailings chute 8, the sand reserve tank 9, the drum type charging spout 10, the 78-cu. ft. lime hydrating and mixing drum 11, which receives the lime from the ball mill on the first floor, the materials silo 12, the material supplying or charging disc 13, the hot water tank 14. This building is 50 ft. high. The lime hydrating and mixing drum revolving on a diagonally placed shaft assures thorough mixing quickly, describing in its movement the figure 8. The hydrating process in the lime drum is observed by means of a recording manometer which records the atmospheric pressure, thus showing when steam must be added to effect complete hydration.

From the storage bin the sand-lime material is delivered by bucket elevator to the three Prima presses of 2700 brick capacity per hour each. The brick are delivered to three hardening cylinders of 66-ft. length and nearly 7 ft. diameter, each holding 20 cars with 1000 brick each. An electric portable winch can remove the cars in a few minutes. Steam for the 120-hp. steam engine and for the hardening cylinder is generated in a steam boiler of 1076 sq. ft. heating surface. The steam engine drives the machinery and has a generator for generating the current for lighting and for feeding various small electric motors. A 20-hp. semi-Diesel engine is used as standby for generating electricity, and when the two-cylinder tandem steam engine is not running.—*Tonindustrie-Zeitung* (1930) **54**, 69, pp. 1128-1129.

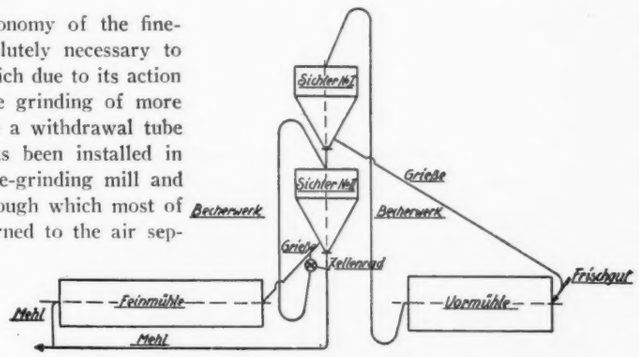


Sketch showing the compact design of the Thiessen sand-lime brick plant

Improvements in Cement-Mill Grinding. A. B. Helbig discusses developments in the closed-circuit mill with air separation. The accompanying sketch illustrates Helbig's idea

of how a modern cement mill should be arranged. The material produced in the primary mill is raised by bucket elevator into the coarse air separator, No. 1, which separates it into oversize and fine material. The oversize material is returned to the primary mill, while the fine material is passed from air separator, No. 1, to air separator, No. 2, in which its flour content is extracted by the new method of closed-circuit screening.

From the point of economy of the fine-grinding mill, it is absolutely necessary to remove the fine flour, which due to its action as a padding hinders the grinding of more fine material. Therefore a withdrawal tube for the fine material has been installed in the tube between the fine-grinding mill and air separator, No. 2, through which most of the fine material is returned to the air separator, No. 2. The apparatus, which has been designed for effecting this withdrawal, is designated as a selector and is indicated in Fig. 1. The remaining fine material, from which as much flour as possible has been removed, is delivered to the fine-grinding mill.



Suggested arrangement of modern air-separation mill

Sichter No. 1—air separator; Sichter No. II, air separator; Frischgut—raw material; Vormuehle—primary mill; Griesse—oversize; Becherwerk—bucket elevator; Zellenrad—bucket wheel (point where selector is installed); Feinmuehle—fine mill; Mehl—flour; Griesse—fine material

Two compartment mills as well as single ball-tube mills can be used for the primary grinding. By employing a selector, air separation and bucket elevator, in a grinding installation with only one air separator and grinding for a standard cement, the output could be increased 28.6% and the power consumption per ton decreased from 37 to 30 kw. hr.; and when grinding finer cement, 33%, and from 51.7 to 40.2 kw. hr., respectively. In conclusion Helbig says: "In America also the great importance of the air separator for dry grinding has been recognized, as is indicated by the announcements in the very outstanding periodical Rock Products of January 4, 1930, pp. 92 to 93, and 192."—*Zement* (1930) **19**, 34, pp. 796-799.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Manufacture of Alumina Cements. The patentee describes improvements in the thermal and grinding efficiency in the process of manufacturing alumina cements, and a method of manufacturing alumina cement, comprising the steps of grinding a raw mixture of lime and bauxite, the latter having an iron content of 5-15%, to a fineness such that at least 3% of the mixture cannot pass through a 900-mesh per sq. cm. sieve, and at least 15% cannot pass through a 4900-mesh per sq. cm. sieve; and calcining the ground mixture, at a temperature at least 100 deg. below the melting point, until it shows a chocolate-brown color.

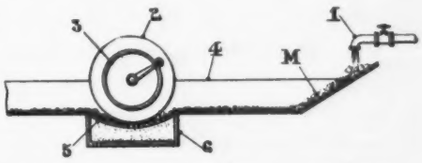
Alumina cement can be produced either by the melting of the raw mixture of lime and bauxite in an electric furnace, or by calcining the raw mixture; the calcining can be performed either at a temperature near to the melting point, in which case the calcined product is a black hard slag, or at temperatures well below the melting point, in which case the burned product shows efficient colors ranging from red to black; generally the higher the temperature the harder and darker the product.—*Béla Spiegl, of Budapest, Hungary. U. S. Patent No.* 1,775,571.

Gravel Dredging Method. The machine shown here would seem to be more of a prospecting device than one which would be used in large scale recovery of gravel. The inventor states that one of its advantages is that it may be used to prospect dry ground without much disturbance of the surface, although it is shown here mounted on a pontoon for river work. It is mentioned as being used in excavating gold bearing gravels.

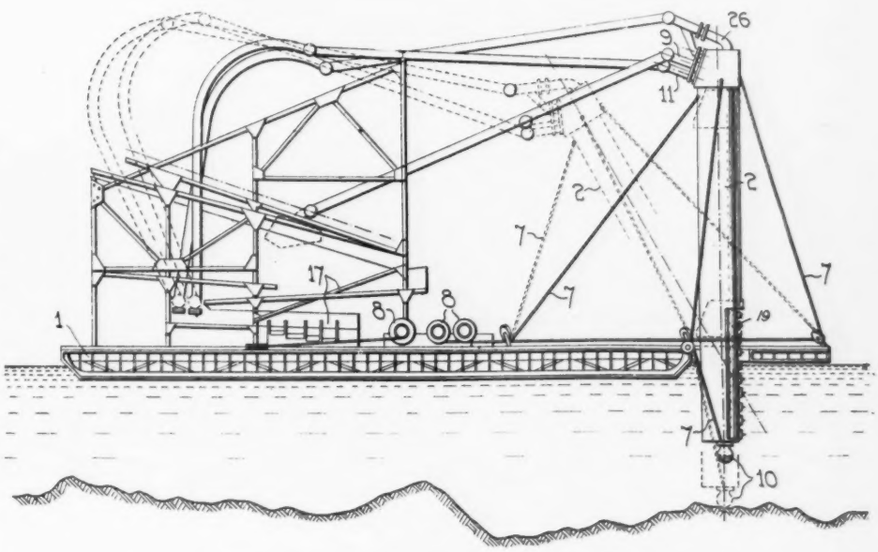
The device is an adaptation of the hydraulic elevator or jet elevator. There are five pipes in a casing, two being needed for the jet elevator. The others are used in sluicing and disintegrating the gravel. In front of the casing is a shield moved up and down by a motor not shown, provided with spikes and water jets placed alternately, and these assist in forcing the casing below the surface. The suction pipe terminates in a hollow globe which is pierced with several holes through which the gravel and sand enters. Around this grates are hung to keep large pieces from clogging the suction.—*D. Jensen, U. S. Patent No.* 1,758,047.

Novel Screening Method. A screening device which employs what seems to be a unique method is shown in the illustration. It has a pneumatic rubber tired wheel turning above a curved screen. The screen is in the bottom of a trough into which the material to be screened is fed with water. The pressure of the tire forces the fine particles through the screen and the coarse particles sink into the tire and are dragged across the screen to the discharge end of the trough.

The inventor speaks of it as a disintegrating device. It is logical to suppose that the pressure of the tire might disintegrate clay balls, for example, and force the clay through the screen while the solid particles would be carried on. But the wear on the screen in such a device might be a point worth considering.—*Eugene de Dorlodot, U. S. Patent No.* 1,767,353.



Unique screening device employing pneumatic rubber tired wheel



Gravel dredging device mounted on pontoon for river work

Portland Cement Output in October

Giving Also Shipments and Stocks for Past Five Years

THE PORTLAND CEMENT industry in October, 1930, produced 14,410,000 bbl., shipped 15,599,000 bbl. from the mills and had in stock at the end of the month 20,699,000 bbl. Production of portland cement in October, 1930, showed a decrease of 13.9% and shipments a decrease of 16.6%, as compared with October, 1929. Portland cement stocks at the mills were 34.6% higher than a year ago.

The statistics here presented are compiled from reports for October, received by the Bureau of Mines from all manufacturing plants except two, for which estimates have been included in lieu of actual returns.

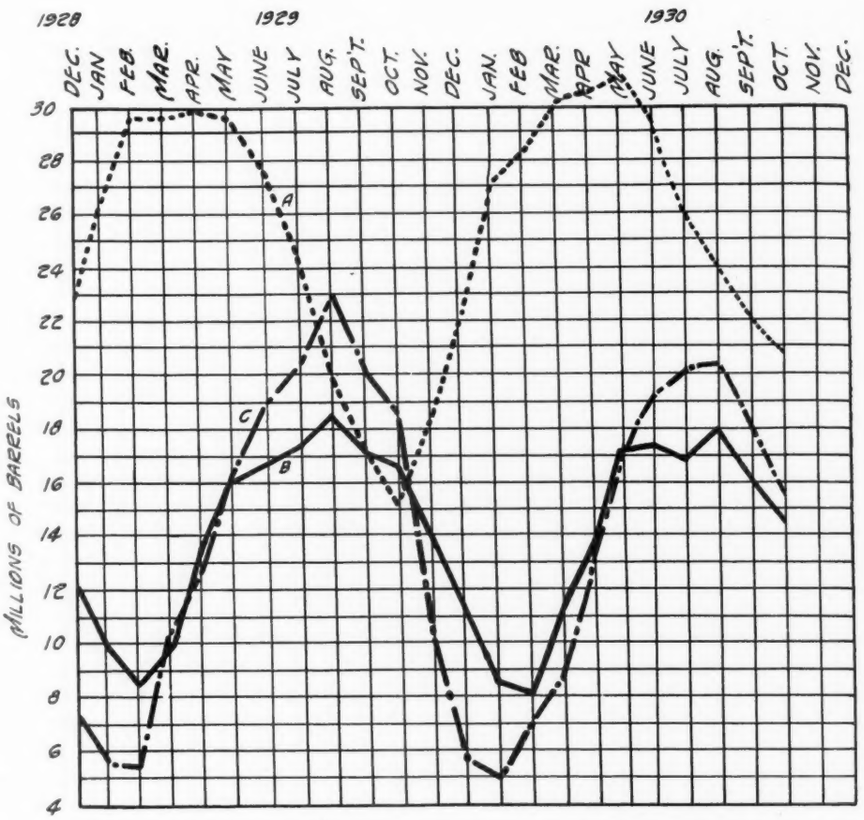
In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of October, 1930, and of October, 1929. In addition to the capacity of the new plants which began operating during the 12 months ended October 31, 1930, the estimates include increased capacity due to extensions and improvements at old plants during the period.

RELATION OF PRODUCTION TO CAPACITY

	October		Sept.	Aug.	July
	1929	1930	1930	1930	1930
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	77.0	65.4	75.7	81.0	77.8
12 mo. ended	67.3	64.2	65.2	65.6	66.1

Distribution of Cement

The following figures show shipments distributed among the states during August and September, 1929 and 1930:



(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN AUGUST AND SEPTEMBER, 1929 AND 1930, IN BARRELS*

Shipped to	1929—August	1930	1929—Sept.	1930
Alabama	271,466	106,464	179,011	68,936
Alaska	2,105	4,465	282	1,362
Arizona	57,184	51,855	56,000	39,785
Arkansas	187,688	165,886	206,476	150,714
California	1,007,181	869,963	915,829	837,669
Colorado	105,397	106,576	91,602	82,050
Connecticut	241,126	205,553	206,737	195,962
Delaware	56,135	47,898	34,281	26,704
District of Columbia	125,732	126,581	107,654	137,507
Florida	100,975	85,673	88,730	76,333
Georgia	160,279	186,694	117,262	163,464
Hawaii	26,037	19,301	24,896	16,778
Idaho	26,051	52,084	27,375	46,308
Illinois	1,969,576	1,604,378	1,721,624	1,704,696
Indiana	990,059	686,122	909,295	497,163
Iowa	1,108,711	1,077,919	968,958	781,608
Kansas	338,052	271,491	332,819	250,548
Kentucky	205,597	265,288	176,115	241,402
Louisiana	172,697	235,564	171,673	163,544
Maine	79,258	128,866	94,201	148,381
Maryland	323,021	314,239	294,089	285,312
Massachusetts	365,297	328,187	356,318	331,061
Michigan	1,891,753	1,269,546	1,601,684	1,018,648
Minnesota	533,434	602,931	430,298	374,833
Mississippi	131,963	96,483	107,651	51,680
Missouri	896,327	770,346	748,870	710,759
Montana	89,417	36,407	77,505	44,217
Nebraska	270,919	226,618	224,168	241,572
Nevada	12,186	14,645	14,180	16,111
New Hampshire	116,275	81,651	75,573	84,449
New Jersey	958,357	709,844	825,204	610,200
New Mexico	29,932	36,680	21,621	28,870
New York	2,768,232	2,596,407	2,237,801	2,515,171
North Carolina	149,085	116,028	129,411	102,658
North Dakota	47,870	31,984	49,597	38,358
Ohio	1,364,665	1,286,700	1,207,197	1,103,327
Oklahoma	371,205	360,766	365,927	348,023
Oregon	124,852	114,400	122,669	112,133
Pennsylvania	1,710,648	1,912,983	1,632,356	1,557,564
Porto Rico	6,995	4,500	4,190	10,250
Rhode Island	101,278	83,057	81,919	100,664
South Carolina	89,733	236,649	64,446	245,776
South Dakota	55,114	72,829	83,173	86,654
Tennessee	441,869	285,916	†328,182	294,910
Texas	877,463	605,660	697,091	573,392
Utah	57,547	44,554	73,952	39,116
Vermont	181,612	104,324	135,894	66,810
Virginia	205,771	179,227	161,521	174,179
Washington	310,711	341,647	305,056	328,595
West Virginia	209,590	216,018	164,543	196,307
Wisconsin	952,914	842,250	759,187	700,327
Wyoming	26,480	20,642	24,015	20,224
Unspecified	89,633	20,373	†52,207	4,888
	22,993,454	20,263,112	19,888,315	18,047,952
Foreign countries	58,546	35,888	61,685	35,048
Total shipped from cement plants	23,052,000	20,299,000	19,950,000	18,083,000

*Includes estimated distribution of shipments from three plants in August and September, 1929; from two plants in August and September, 1930.
†Revised.

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production	1930	Stocks at end of month 1929	1930
January	12,012,000	10,504,000	9,642,000	9,646,000
February	11,255,000	10,008,000	12,436,000	11,572,000
March	12,450,000	13,045,000	14,948,000	13,503,000
April	14,166,000	15,025,000	15,479,000	15,164,000
May	15,444,000	16,607,000	14,911,000	14,668,000
June	15,312,000	15,895,000	13,587,000	13,452,000
July	15,214,000	15,067,000	11,619,000	*11,684,000
August	15,829,000	*15,244,000	8,995,000	*9,275,000
September	15,165,000	*14,577,000	7,009,000	*7,783,000
October	15,515,000	13,895,000	5,934,000	7,331,000
November	14,087,000	.....	6,134,000	.....
December	12,539,000	.....	7,526,000	.....

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN OCTOBER, 1929 AND 1930, AND STOCKS IN SEPTEMBER, 1930, IN BARRELS

District	Production 1929—Oct.—1930		Shipments 1929—Oct.—1930		Stocks at end of month 1929	1930	Stocks at end of Sept., 1930*
Eastern Penn., N. J., Md.	3,571,000	2,793,000	4,043,000	3,535,000	4,000,000	4,225,000	4,966,000
New York and Maine	1,129,000	1,220,000	1,407,000	1,201,000	996,000	1,088,000	1,069,000
Ohio, West'n Penn., W. Va.	1,731,000	1,655,000	2,176,000	1,704,000	2,240,000	3,030,000	3,079,000
Michigan	1,437,000	1,130,000	1,323,000	1,093,000	1,075,000	2,317,000	2,279,000
Wis., Ill., Ind. and Ky.	1,935,000	1,938,000	2,346,000	2,115,000	1,329,000	2,574,000	2,751,000
Va., Tenn., Ala., Ga., Fla., La.	1,306,000	1,132,000	1,419,000	1,248,000	1,498,000	1,697,000	1,814,000
East'n Mo., Ia., Minn., S.D.	1,718,000	1,591,000	1,870,000	1,618,000	1,273,000	1,542,000	1,569,000
Western Mo., Neb., Kansas, Okla. and Ark.	1,331,000	957,000	1,508,000	947,000	621,000	1,652,000	1,643,000
Texas	777,000	484,000	743,000	469,000	527,000	721,000	707,000
Colo., Mont., Utah, Wyo., Ida.	323,000	134,000	346,000	227,000	451,000	415,000	508,000
California	1,179,000	953,000	1,183,000	1,006,000	937,000	966,000	1,020,000
Oregon and Washington	294,000	423,000	331,000	436,000	434,000	472,000	484,000
	16,731,000	14,410,000	18,695,000	15,599,000	15,381,000	20,699,000	21,889,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production—1930		1929—Shipments—1930		Stocks at end of month 1929	1930
January	9,881,000	8,498,000	5,707,000	4,955,000	26,797,000	27,081,000
February	8,522,000	8,162,000	5,448,000	7,012,000	29,870,000	28,249,000
March	9,969,000	11,225,000	10,113,000	8,826,000	29,724,000	30,648,000
April	13,750,000	13,521,000	13,325,000	13,340,000	30,151,000	30,867,000
May	16,151,000	17,249,000	16,706,000	17,224,000	29,624,000	30,891,000
June	16,803,000	17,239,000	18,949,000	18,781,000	27,505,000	29,364,000
July	17,315,000	17,078,000	20,319,000	20,153,000	24,525,000	26,289,000
August	18,585,000	17,821,000	23,052,000	20,299,000	20,056,000	23,824,000
September	17,223,000	16,124,000	19,950,000	18,083,000	17,325,000	*21,889,000
October	16,731,000	14,410,000	18,695,000	15,599,000	15,381,000	20,699,000
November	14,053,000	.....	11,222,000	.....	18,213,000	.....
December	11,215,000	.....	5,951,000	.....	23,538,000	.....
	170,198,000	.....	169,437,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN OCTOBER, 1929 AND 1930, IN BARRELS

District	1929—Production—1930		Stocks at end of month 1929	1930
Eastern Pennsylvania, New Jersey and Maryland	3,202,000	2,470,000	962,000	1,025,000
New York and Maine	1,045,000	1,183,000	441,000	430,000
Ohio, Western Pennsylvania and West Virginia	1,578,000	1,525,000	*478,000	648,000
Michigan	1,350,000	1,141,000	465,000	820,000
Wisconsin, Illinois, Indiana and Kentucky	1,779,000	1,706,000	367,000	649,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	1,205,000	1,088,000	603,000	876,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,657,000	1,590,000	499,000	500,000
West'n Missouri, Nebraska, Kansas, Oklahoma, Arkansas	*1,281,000	992,000	*208,000	301,000
Texas	793,000	522,000	293,000	328,000
Colorado, Montana, Utah, Wyoming and Idaho	283,000	160,000	274,000	329,000
California	1,059,000	1,091,000	944,000	1,023,000
Oregon and Washington	283,000	427,000	400,000	402,000
	15,515,000	13,895,000	5,934,000	7,331,000

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1929 AND 1930

Month	1929—Exports—1930 Barrels	Value		Value	1929—Imports—1930 Barrels	Value	Barrels	Value
January	78,639	$283,002	82,387	$293,135	151,302	$177,976	201,609	$207,461
February	58,886	225,590	64,267	217,798	118,930	123,123	114,455	119,717
March	69,079	235,164	117,563	357,896	131,909	112,788	43,622	59,981
April	64,145	218,316	57,419	200,217	89,668	114,281	140,871	178,226
May	57,955	219,366	57,423	198,170	200,646	267,854	94,696	111,998
June	96,055	287,612	82,077	223,639	203,545	228,170	55,356	74,370
July	71,992	247,177	47,082	166,577	182,098	199,960	12,404	20,973
August	60,013	225,762	49,031	167,579	183,938	199,403	35,323	39,029
September	86,268	308,631	46,594	153,384	112,372	152,239	51,096	59,721
October	101,359	337,839	.....	.....	172,566	187,504	.....	.....
November	53,378	198,197	.....	.....	96,568	95,844	.....	.....
December	88,403	297,255	.....	.....	84,358	79,098	.....	.....
	886,172	$3,083,911	.....	.....	1,727,900	$1,938,240	.....	.....

Exports and Imports†*

These figures were compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN SEPTEMBER, 1930

Exported to	Barrels	Value
Canada	4,857	$17,168
Central America	2,659	14,006
Cuba	4,805	12,298
Other West Indies and Bermuda	1,995	2,391
Mexico	7,880	22,467
South America	18,175	62,316
Other Countries	3,223	19,738
	46,594	$153,384

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN SEPTEMBER, 1930

Imported from	District into which imported	Barrels	Value
Belgium	Massachusetts	23,083	$27,283
Canada	Maine and N. H.	197	$591
	Porto Rico	2,564	3,744
	Total	2,761	$4,335
Denmark	New York	21,225	$21,139
France	New York	862	$1,559
Germany	Los Angeles	752	$1,438
	San Francisco	127	327
	Total	879	$1,765
Japan	Hawaii	775	$818
United K'gd'm.	New York	1,511	$2,823
	Grand total	51,096	$59,721

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN SEPTEMBER, 1930

	Barrels	Value
Alaska	2,092	$ 5,035
Hawaii	15,240	38,195
Porto Rico	5,720	10,005
	23,052	$53,235

*The value of exports of domestic cement is the actual cost at the time of exportation in the ports of the United States whence they are exported, as declared by the shippers on the export declarations.

†The value of imported cement represents the foreign market value at the time of exportation to the United States.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid October 1, 1930, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, OCTOBER 1, 1930

City	MATERIAL: Portland cement, per bbl. exclu. of cont.	Gypsum wallboard, ⅜ in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾ in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.90	.....	$25.00	$1.50	$2.25	.....
New London, Conn.	2.80	$25.00	24.00	1.50	3.00	$18.00
Waterbury, Conn.	3.00	30.00	20.00	1.35	2.45	20.00
Haverhill, Mass.	2.80	25.00	20.00	1.50	.....	18.50
New Bedford, Mass.	2.65	27.00	18.50	1.75	3.00	17.50
Albany, N. Y.	2.97	24.75	18.00	.....	.....	17.10
Buffalo, N. Y.	2.95	21.00	18.00	1.85	2.05	16.00
Poughkeepsie, N. Y.	2.18	.....	.....	2.25	2.00	.....
Rochester, N. Y.	3.25	22.00	22.00	1.75	2.40	11.00
Syracuse, N. Y.	3.00	22.50	18.00	2.00	2.25	17.00
Paterson, N. J.	2.40	25.00	18.00	1.50	2.10	17.50
Trenton, N. J.	2.40	26.00	18.00	1.50	2.10	17.50
Harrisburg, Penn.	2.65	27.00	16.00	3.10	1.50	18.50
Philadelphia, Penn.	2.30	.....	15.50	1.85	2.65	18.75
Scranton, Penn.	2.80	.....	20.00	3.25	.....	19.00
Baltimore, Md.	2.40	.....	13.00	2.40	2.75	15.50
Washington, D. C.	2.25	25.00	14.00	.....	.....	16.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.80	35.00	16.00	3.15	3.50	18.00
Columbia, S. C.	2.50	.....	12.50	1.00	1.50	14.00
Atlanta, Ga.	2.85	.....	17.50	2.50	3.25	18.00
Savannah, Ga.	2.25	25.00	20.00	1.75	5.50	16.00
Tampa, Fla.	3.00	.....	24.00	2.00	3.75	20.00
Birmingham, Ala.	3.00	.....	19.00	2.85	2.25	17.00
Shreveport, La.	3.20	.....	.....	2.00	4.75	22.00
Erie, Penn.	$2.40	$22.50	$19.00	$2.25	.....	$16.00
Akron, Ohio	2.67	36.00	18.00	1.85	$1.85	.....
Cincinnati, Ohio	2.96	25.00	16.40	2.63	2.60	.....
Cleveland, Ohio	2.40	22.00	14.00	1.95	2.70	14.50
Columbus, Ohio	2.70	.....	14.00	4.05	2.25	15.00
Toledo, Ohio	2.70	22.50	16.00	2.50	2.75	14.50
Youngstown, Ohio	2.95	.....	18.00	3.71	2.75	15.00
Detroit, Mich.	2.60	25.00	14.80	2.23	3.00	.....
Saginaw, Mich.	2.35	25.00	18.00	2.50	3.25	17.00
Terre Haute, Ind.	2.85	28.00	18.00	1.65	3.50	20.00
Louisville, Ky.	2.52	.....	15.50	2.20	2.43	16.00
Chicago, Ill.	2.25	20.00	17.00	2.00	2.00	15.00
Milwaukee, Wis.	2.25	25.00	16.00	1.50	1.30	18.00
Des Moines, Iowa	3.08	.....	20.00	1.10	5.00	.....
Kansas City, Mo.	2.50	25.00	21.00	1.70	3.04	15.00
St. Louis, Mo.	2.15	.....	18.00	1.35	1.00	18.00
St. Paul, Minn.	2.45	.....	18.00	2.23	1.75	18.00
Grand Forks, N. D.	2.80	25.00	.....	2.60	.....	16.00
Sioux Falls, S. D.	3.00	.....	24.00	1.25	2.25	15.00
San Antonio, Texas	2.60	.....	20.00	2.10	2.35	19.15
Tucson, Ariz.	3.37	.....	27.00	1.25	2.50	17.10
Los Angeles, Calif.	2.30	.....	22.00	1.85	1.90	.....
San Francisco, Calif.	2.60	.....	22.50	1.40	1.60	18.50
Seattle, Wash.	1.75	35.00	22.00	1.40	.....	20.00

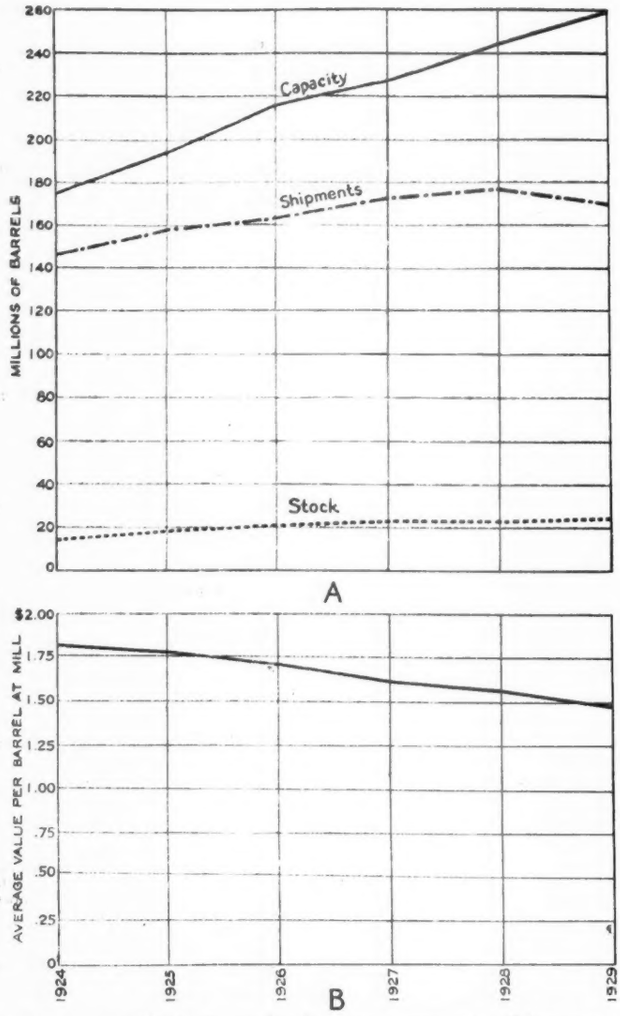


Fig. 1. A, Finished portland cement capacity, shipments, stock at mills at end of year; B, Range in average factory value per barrel of finished portland cement, 1924-1929

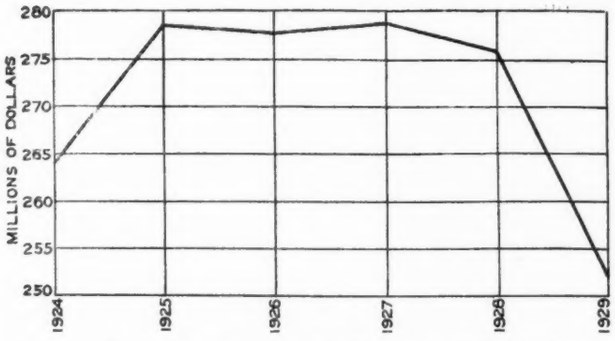


Fig. 2. Total factory value of shipments of finished portland cement, 1924-1929

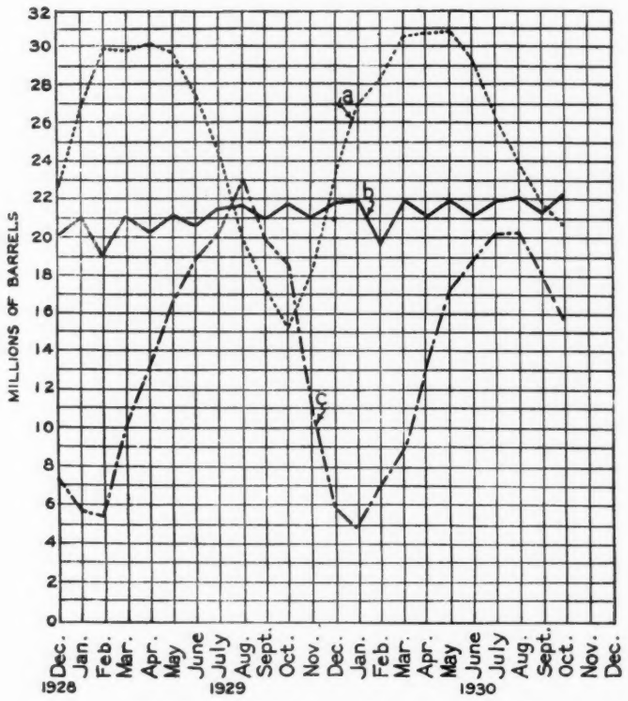


Fig. 3. Monthly finished portland cement shipments, stocks, and manufacturing capacity for period December, 1928, to October, 1930; (a) Stocks of finished portland cement at factories; (b) monthly finished portland cement capacity estimated available; (c) shipments of finished portland cement from factories

The Current Situation in Cement

Plant capacity and shipments have increased rapidly in the cement industry since 1924, according to the bureau. The increase in shipments became very slow about 1927, and from 1928 there was a decided decrease. While shipments are falling off, plant capacity is steadily increasing, and there is no indication of any recession in the growth of plant capacity, the bureau points out.

Minor fluctuations occur in plant capacity from month to month, while stocks and shipments show marked seasonal fluctuations which are characteristic of the industry. Stocks of cement in 1930 were considerably higher than for the corresponding months in 1929. Shipments in 1930 show a moderate decrease from the 1929 figures. Shipments for the first 10 months of 1929 total 152,264,000 bbl. and for 1930, 144,272,000 bbl.

The facts brought out most forcibly in the bureau's survey of the situation are: (1) A rapidly increasing plant capacity with no indication of a falling off in the rate of increase; (2) a moderate falling off in shipments; (3) a moderate increase in stocks on hand, and (4) a pronounced and steady decrease in price per barrel. Future conditions that may develop as a result of this combination of circumstances demand the earnest consideration of every cement plant operator, the bureau concludes.

Statistics of Capacity, Shipments and Stocks, 1924-1929, by Months, 1929-1930, and Range in Mill Values and Prices, 1924-1929

The following tables, with accompanying graphs, compiled from reports of the producers of portland cement, show comparative figures of finished portland cement manufacturing capacity, mill shipments and stocks for the years 1924-1929, and by months, for the period, December, 1928, to October, 1930, and range in factory values and prices, 1924-1929:

FINISHED PORTLAND CEMENT CAPACITY, SHIPMENTS, STOCKS AT MILLS AT END OF YEAR, AND AVERAGE FACTORY VALUE PER BARREL IN THE UNITED STATES, 1924-1929* (FIGURES 1-A AND 1-B)

Year	Annual capacity (barrels)	Shipments (barrels)	Stocks at end of year (bbl.)	Avg. factory value per bbl.
1924	175,100,000	146,047,549	14,151,695	$1.81
1925	193,558,000	157,295,212	18,336,173	1.77
1926	†215,300,000	162,187,090	20,740,187	1.71
1927	227,080,000	171,864,728	22,457,382	1.62
1928	243,702,000	175,838,332	22,760,103	1.57
1929	259,344,000	169,868,322	23,537,817	1.48

TOTAL FACTORY VALUE OF SHIPMENTS OF FINISHED PORTLAND CEMENT, 1924-1929* (FIGURE 2)

1924	$264,046,708
1925	278,524,108
1926	277,965,473
1927	278,854,647
1928	275,972,945
1929	252,153,789

MONTHLY ESTIMATES OF FINISHED PORTLAND CEMENT SHIPMENTS, STOCKS AND MANUFACTURING CAPACITY FOR PERIOD DECEMBER, 1928, TO OCTOBER, 1930, IN BARRELS (FIGURE 3)

Month	Shipments	Stocks at end of month	Capacity
December, 1928	7,384,000	22,760,000	20,181,000
January, 1929..	5,707,000	26,797,000	21,049,000
February	5,448,000	29,870,000	19,012,000
March	10,113,000	29,724,000	21,049,000
April	13,325,000	30,151,000	20,340,000
May	16,706,000	29,624,000	21,142,000
June	18,949,000	27,505,000	20,730,000
July	20,319,000	24,525,000	21,421,000
August	23,052,000	20,056,000	21,607,000
September	19,950,000	17,325,000	21,060,000
October	18,695,000	15,381,000	21,731,000
November	11,222,000	18,213,000	21,060,000
December	5,951,000	23,538,000	21,793,000
January, 1930..	4,955,000	27,081,000	21,886,000
February	7,012,000	28,249,000	19,684,000
March	8,826,000	30,648,000	21,793,000
April	13,340,000	30,867,000	21,120,000
May	17,224,000	30,891,000	21,886,000
June	18,781,000	29,364,000	21,180,000
July	20,153,000	26,289,000	21,948,000
August	20,299,000	23,824,000	22,010,000
September	18,083,000	*21,889,000	21,300,000
October	15,599,000	20,699,000	22,041,000

*From annual reports of the producers of portland cement.
†Estimated by the Bureau of Mines.

Reorganization of Committee C-1 on Cement of American Society for Testing Materials

COMMITTEE C-1 on Cement, of the American Society for Testing Materials, at a recent meeting held in Washington, effected a reorganization and prepared a preliminary plan of work for the coming two years. With this reorganization the committee will be in a better position to carry on more fundamental and detailed studies of the two most widely used hydraulic cements —high-early-strength portland cement and portland cement, specifications for both of which have been adopted by the society—and of the masonry and plastic cements, whose use is growing so rapidly.

The outstanding feature of the new plan of committee operation places the investigations and the preparation of a standard of each type of cement under a separate subcommittee. For the present, therefore, there will be a subcommittee on standard portland cement, one on masonry cement and one on all high-early-strength cements, both of the portland and high-alumina types. Another subcommittee will have the duty of preparing standard methods of test. This subcommittee will help the other subcommittees develop and refine the methods they think are needed to indicate the desired requirements, and further make as uniform and co-ordinated as possible the testing methods for all hydraulic cements.

Plans for future work are to make extensive studies of the sometimes considered radical new test methods suggested by progressive users and producers. Studies will be made of those requirements which are believed to be indicative of a property which would indicate the deportment of the cement in use over a long period of time or under possible adverse conditions rather than those indicating laboratory differences in cements.

The committee will welcome at all times, and especially now when the subcommittees are developing new programs of investigational work, suggestions from all those interested in the testing and using of cement, according to the society's official announcement. The committee would be very glad to have comments as to the types of tests which should be studied, data indicating the adequacy or inadequacy of present methods, suggestions as to specific requirements and in fact anything that an interested party would consider of value to the committee.

Cement Business Said to Be Fair in Spokane Territory

SPOKANE, Wash., is one of the most favorably situated cities of the West so far as the cement industry is concerned. With one mill just beyond the east city limits and another mill 100 miles north, a tremendous amount of material is handled annually through Spokane.

Both companies, the International Portland Cement Co., Ltd., and the Lehigh Portland Cement Co., expect steady increase in business as the result of the enlarged highway and street paving programs contemplated for the next two years.

The two companies represent an investment of $3,000,000 and operating on a 75% capacity basis, which is considered a normal operation, they produce nearly 1,000,000 bbl. of cement a year.

"In making cement, the grinding of heavy rock causes such wear on machinery that periodical shutdowns are necessary to overhaul the machinery," Henry M. Heleniak, secretary and sales manager of the International, said: "The plants in the Inland Empire are operating on a 75% capacity basis."

The increased paving in cities and of state highways and increased building operations planned for the next two years indicate that production may have to be stepped up to close to normal within a few years, according to an analysis of uses of cement presented by W. G. Perrow, manager of the Lehigh company here.

The International company uses 29,250 tons of coal from Washington's coal region, spends $334,350 on its pay roll, $145,250 for mill supplies, $78,750 for electric power, $270,450 for inbound freight charges and $195,700 for outbound freight charges. Its production on this basis is 450,000 bbl. For taxes it pays out $10,207, records show. The number of employes necessary at the Irvin plant for this production is 60 and at the Marcus quarry 40.

The Lehigh company's production is about 490,000 bbl., its pay roll $239,201, mill supplies $108,249, freight charges on inbound material $260,959, and on outbound materials $387,491. This company generates its own electricity at its plant near Metaline Falls, the quarry also being located there, but this represents a charge of $84,145. Its taxes are $12,000 annually. It uses 32,814 tons of Washington coal on its 75% operation. It employs roundly 100 men. —*Spokane* (Wash.) *Chronicle.*

Northampton Plant of Universal-Atlas Helps Make Movie

FORTY THOUSAND TONS of rock were unleashed with the explosion of 6000 lb. of dynamite at 11 a. m. November 5 in the Northampton quarries of the Universal-Atlas Cement Co. This quarry blast was staged for the Bureau of Mines of the United States Department of Commerce for the purpose of embodying quarrying methods in the story of cement, "Concrete Facts," one of the many industrial films being made by the government for educational purposes.

Scott Turner, director of the bureau of mines, and M. F. Leopold, the department's supervising engineer of productions, together with the government cameraman, Tierry Miller, were in Allentown to manage arrangements for the blast.

With the assistance of men of the cement company the necessary shoring was built for the safety of the cameramen.

The blast was designed to break out a piece of terrain 270 ft. in length, 70 ft. in width and 40 ft. in depth. A double row of 5½-in. well-drill holes, 33 in number, were loaded with 6000 lb. of explosive.

The filming of the blast for the U. S. Department of Commerce was the first one for which there is to be sound recording. The films when completed are available without charge to any school, college, chamber of commerce, civic or industrial groups, They are not intended for advertising and in none of the shots are the names of the companies depicted where the scenes are taken.—*Allentown* (Penn.) *Call.*

Louisiana Starts Building Program

PRELIMINARY STEPS were taken November 6 by the State Board of Liquidation to start the $100,000,000 improvement program adopted November 4 by the voters.

The board, which is composed of the governor and six other state officers, set December 10 as the date for receiving bids for the $5,000,000 state capitol building to be built at Baton Rouge to house all state departments. The building will be the equivalent of 33 stories in height.

The board tentatively set December 27 as the date for receiving bids for the first $15,000,000 block of the $75,000,000 road and bridge bond issue. This is the earliest date on which the bonds can be issued, the attorney general, Percy Saint, told the board, but by that time bids will have been received for $5,000,000 road work which has been advertised for letting on November 25.

Portland Cement Association President Urges Business Aggressiveness

Calls for Continued Effort in Cement Industry to Help General Business

CONTINUED AGGRESSIVENESS with an eye toward speeding up general business recovery was urged upon American portland cement manufacturers at the annual meeting of the Portland Cement Association in Chicago, by President Frank H. Smith. No other industry, the Association executive pointed out, is better situated to aid in alleviating the depressed business condition which has been general for the last few months.

Every bit of aggressiveness, he told the members of the Association that assembled at the Blackstone Hotel in Chicago, November 17, 18 and 19, exerted in the cement industry and its allied agencies is sure to speed up general recovery.

"The successful conduct of the cement business," President Smith said, "is fundamental not only to our 50,000 workers and their families but in days such as these our efforts are vitally helpful to at least an equal number of those who supply transportation, coal, explosives, oil, gypsum and other commodities required to make cement.

"We market our cement by creating markets for concrete; in so doing we provide work to those who furnish sand, gravel, stone reinforcing materials, forms, contractor's equipment and other items. So the resultant of our development activities is to maintain or increase the purchasing power of very many more people than we actually employ.

"In a broad sense, whatever measure of prosperity we enjoy is the public's. We know that every pound of cement well used in roads, bridges, buildings or houses, earns the owner an eventual return far greater than the manufacturer's profit."

While the portland cement industry up to the end of October has felt a decline of nearly eight million barrels in 1930 shipments, President Smith pointed out that so far the 1930 showing is well above that of business in general. The decline is a little over 5% of the 1929 figures. He attributed this showing to benefits reaped from patiently cultivated markets. The demand now on cement manufacturers by both the cement industry and business in general is greater aggressiveness in all fields of business endeavor.

"It is my firm belief," he said, "that the Portland Cement Association, because of its competent, energetic personnel and its splendid equipment, is in a favorable position to help speed up general business. The psychology which sells a purchaser concrete should convince him that he may safely make other sound purchases. The man who has purchased cement must, of necessity, buy other things as well. Association fieldmen as well as member company salesmen and others who make public contacts, should be able to influence many people who are not buying as freely as usual. By striving to improve the general situation, we will have discovered one of the best ways of helping ourselves."

Frank H. Smith, elected chairman of the board of directors, Portland Cement Association

Mr. Smith urged especially great concentration of efforts on the building industry and public improvement programs. The unfounded fear, in northern states, of winter construction can and should be broken down. Construction started this winter, besides helping to alleviate the present unemployment situation, will create employment for thousands of people next spring and summer. There is no reason for delaying improvement programs, he declared. Where public funds are available projects should start immediately. Such work initiated through bond issues and other means of public finance, can create employment now and be paid for in the future.

Mr. Smith dealt at some length with the greatly improved highway conditions brought about in the country during the last dozen years.

"The very active construction of main line roads during the last dozen years has led, naturally, to a strong sentiment for the improvement of secondary roads as feeders to primary systems. The 'farm to market' highways have acquired a very substantial following throughout the rural districts and a careful study of the requirements, and of the 2000 miles already in use, shows that the single-tracked concrete road is admirably adapted for this purpose."

These roads, it was pointed out, are meeting the demand of rural sections for economical pavement where the volume of traffic does not demand a full-width pavement.

Unwarranted speculation in new mill enterprises was warned against by the Portland Cement Association president. An industry, he pointed out, that is already overbuilt should do its utmost to discourage public investment in new enterprises that are, at the beginning, marked for failure. In this connection he stated that at the present time there is an idle capacity within the industry of approximately 100 million barrels, almost equal to the total reported capacity of the world's two next largest cement producing countries, Germany and France.

Mr. Smith pointed with pride to the reduction within the industry during the last five years of accidents involving either injury or death. The standard of living of cement workers, he declared, has been raised to higher levels than ever before attained. Credit for both of these factors, he attributed in a great part, to the efficient operation of the Portland Cement Association along these lines.

The Association president's address was delivered before approximately 250 executives of cement companies located throughout the United States and Canada.

Concrete Highway Building Pointed for Record Year

Concrete highway construction in the United States will reach a new all-time peak this year, according to the predictions of William M. Kinney, general manager of the Portland Cement Association. Mr. Kinney made the statement at the annual meeting of the Portland Cement Association.

For the first 10 months of 1930, Mr. Kinney said, concrete highway yardage showed a 15% increase over the same period of 1928. At the same time it surpassed the total for the first 10 months of last year with a 16% increase. This, he said, is indicative that a new high mark in the construction of concrete highways will be reached in 1930.

Notwithstanding this increase, Mr. Kinney pointed out, highway construction over the nation is far behind current requirements, which continue to mount faster than new highways are completed. The total of permanently improved mileage within the country today is but a small portion of the great network of roads which must be given attention before an adequate nation-wide highway system is completed. The demand and necessity for permanent highway improvement, even considering this year's marked increase in construction, are several years in advance of public programs.

William M. Kinney, who was elected vice-president and general manager of the Portland Cement Association

An encouraging and notable feature in the highway field, he stated, has been the swing in construction activities to states where heretofore there has been little action. South Carolina is beginning an improvement program by means of a $65,000,000 bond issue. Louisiana, which two years ago voted a $30,000,000 bond issue for road improvements, recently added $68,000,000 to it. Texas is considering a $350,000,000 bond issue for state road improvements. In all states there is a steadily increasing trend to more and higher type paving. Even though the public's reaction to road improvement is favorable, he said, projects are slow in getting under way.

During the last few years rural sections have shown a trend toward permanency in road improvements. Secondary roads, that are generally under the jurisdiction of counties and townships where funds and technical supervision are limited, are being given attention. The use of single lane concrete roads is becoming popular for highways where full-width pavement is impractical, and permanent, economically maintained roads are important. Nearly 2000 miles of narrow concrete roads are in use in this country. This type of road has proven economical because upkeep is negligible and it can be easily widened when traffic conditions demand. Among the counties of the nation, Mr. Kinney said, that have taken the lead in single-lane highway construction, are Vermilion, Champaign and Iroquois counties, Illinois; Kent county, Maryland; Clackamas county, Oregon, and Mississippi county, Missouri.

There has been a general lag in street paving over the country. This has been due largely to the unwillingness of property owners to commit themselves further at the present time. A return of confidence, however, is all that should be needed to get paving substantially under way, permitting work to proceed which in ordinary course is not paid for for several years. Property owners should urge public officials to proceed now with needed paving, taking advantage of low cost materials and labor, rather than continue high cost maintenance and repairs to worn out streets.

No New Officers Elected

Frank H. Smith, president of the Lawrence Portland Cement Co., New York City, who has been president of the Association for the past two years, was elected chairman of the board of directors. The board of directors deferred the election of a president, at this time. They did elect William M. Kinney, who has been general manager of the Association for the past 12 years, vice-president and general manager.

Technical Sessions

The technical sessions of the cement-mill section of the Association included, besides the reports of the standing committees on accident prevention, conservation, and technical problems, papers on "Air Separators" by H. A. Reichenbach, superintendent of the Nazareth Cement Co., Nazareth, Penn.; on the "Cement Reference Laboratory" by J. R. Dwyer, research associate, U. S. Bureau of Standards, Washington, D. C., and P. H. Bates, in charge of the cement and allied products, U. S. Bureau of Standards, on "The Testing Problem," by J. C. Pearson, assistant to the chemical engineer, Lehigh Portland Cement Co., Allentown, Penn.; on "Specific Application of Methods of Test to Our Industry," by O. L. Moore, engineer of tests, Universal Atlas Cement Co., Chicago, Ill., and on "The Relation of Acceptance Test to Usage" by Duff A. Abrams, director of research, International Cement Corp., New York City.

New British Company to Produce "Rheocrete"

LISTED among the latest company registrations in Britain is Rheocrete (Northern), Ltd., Trafford Park, Manchester, an undertaking floated with the object of producing "rheocrete," a pumice-rock building material. Although only just beginning, this company is a subsidiary of an old-established concern (F. McNeill and Co.), and although rheocrete has not hitherto been manufactured in northern England, it has been produced extensively in London.

Pumice rock as a building material has only recently been introduced into the United Kingdom, but in Germany its possibilities have been recognized for many years. Neither the company nor its product, therefore, is in any sense experimental. Rheocrete pumice, which is entirely free from all foreign matter, forms a natural and excellent base for concrete building and flooring materials. It should be mixed with rapid-hardening cement—nine parts of graded rheocrete to one part of cement—watered twice daily for three days, and left three weeks before any covering is put on.

With this mixture a concrete is obtained weighing at the maximum 40 lb. per cu. ft. The advantages claimed for it are its durability, its fireproof properties, and its sound-absorbing qualities, while condensation troubles are claimed to be avoided by reason of its vesicular structure. Its simplicity in use is a further advantage, since it can be cut with a straw and gives a good fixing for nails without the use of plugs. It does not, moreover, exercise any chemical action on steel or iron work, nor does it discolor plaster or wall paper. The new undertaking anticipates no difficulty in disposing of a large output of rheocrete.

Nebraska Sand and Gravel Producers Organize Association

GRAVEL PRODUCERS of Nebraska held a meeting November 1 at the Cornhusker hotel, Lincoln, Neb., for the purpose of organizing an association. Among those who are attending the meeting are George D. Schellberg of Omaha, A. C. Lund of Kearney, William Niefelt of Omaha, R. B. Steele of Fairbury, Herman Fairchild of Endicott, and H. F. Peterson of Omaha.

The new organization purposes to foster the interests of the industry in the state. Among the things discussed, according to R. F. Wood, of Lincoln, were the methods used by the state highway department in letting gravel contracts and highway maintenance.—*Lincoln* (Neb.) *Star*.

Mason City (Iowa) Cement Plants Have Good Year

BOTH THE PLANTS of the Northwestern States Portland Cement Co. and the Lehigh Portland Cement Co., Mason City, Ia., are entering the winter months with depleted bins and a prospect of an all season run, according to the *Mason City Globe-Gazette*.

Both plants enjoyed a satisfactory year, thanks to Iowa's big pavement program. The demand for Mason City made cement was sustained throughout the season and promises to continue next year, especially if Iowa continues with the development of its highways.

B. A. MacDonald, assistant to the president of the Northwestern States Portland Cement Co., stated his plant was planning to continue its operation through the winter except for a short shutdown for the customary repairs in February or the first part of March. The Lehigh plant also expects to operate through the winter season.

One of the special events of the year in the local cement industry was the reorganization of the Northwestern company into an Iowa corporation. The company was previously incorporated under the laws of West Virginia.

The reorganization was effected in order that the local plant might be more closely allied with the industrial development of the state. The change also will bring about a savings in taxes and the payment of a larger proportion of taxes in this state. The change was made possible by an amendment of the Iowa law, which removed several impossible conditions.

The reorganization of the corporation marks another step in the almost phenomenal growth of the Northwestern States Portland Cement Co. since it was incorporated in 1906. Most of the expansion which brought the plant to its present capacity came during the 16 years when C. H. MacNider, father of Col. Hanford MacNider, the present head of the company, was the directing chief of its operations.

The construction of the mill was started shortly after the incorporation by the Cowham Engineering Co. and was completed two years later. W. F. Cowham of Jackson, Mich., was the first president. He was succeeded by Mr. MacNider, who served until his death in October, 1928.

During the 16 years under Mr. MacNider's efficient leadership the capacity of the plant was doubled. It was increased from its original capacity of 4000 bbl. daily to 8000 bbl. daily and is now rated one of the largest in the industry. A few of the larger improvements which came during Mr. MacNider's management are:

Installation of the waste-heat boilers, thereby eliminating approximately 200 tons of coal a day required for generating the required power.

The silo cement storage having a capacity of approximately 275,000 bbl., bringing the storage up to its present capacity of 700,000 bbl.

The building for housing the machine shop and supplies.

The mixing tanks for mixing the raw materials.

Installation of the Allis-Chalmers 5000-kw. turbine and condenser.

The plan to reorganize the company is one of the first steps taken by the son of the elder MacNider to improve on the management of the corporation since the control passed to local persons last fall.

Fire Damages Bag House at North American Cement's Security Plant

FIRE caused damage estimated at more than $50,000 to the plant of the North American Cement Corp., at Security, Md., early on November 1. The bag storage and cleaning department were wrecked by the flames. E. S. Guth, superintendent of the plant, said there were 500,000 bags stored in the building and the total loss would not be known until an investigation could be made.

Besides damage to the plant, two box cars on the Western Maryland siding were destroyed and another car badly damaged.

Due to the frantic efforts of firemen, the blaze was confined to two buildings and did not reach the main storage building.

Several employes of the plant said there was fire in a cement bin, but could not say whether this was the cause of the fire.

The fire will throw more than 50 men temporarily out of employment. It is understood that rebuilding operations will begin at once.

The plant of the North American Cement Corp. is located a mile and a half east of Hagerstown.—*Philadelphia* (Penn.) *Record*.

1930 Road School at Purdue University

THE PROCEEDINGS of the Sixteenth Annual Road School held during January, 1930, at Purdue University, Lafayette, Ind., have been published as Bulletin No. 23 of the Engineering Extension Department of the university.

This school was held under the direction of the Engineering Extension Department and the School of Civil Engineering in cooperation with the state highway commission and various county and city associations, and the proceedings were compiled and edited by Ben H. Petty, associate professor of Highway Engineering. The meetings extended over five days, with papers on various subjects of interest, group meetings for a discussion of problems and an exhibit of materials and equipment.

The attendance of 590 men included state, county and city officials, contractors and material and equipment men.

Cement Dust Problem at Mason City, Iowa

COL. HANFORD MacNider, chairman of the board, Northwestern States Portland Cement Co., Mason City, Iowa, met with the city council recently to consider the problem of cement dust. He said he hoped natural gas would cut down the dust perceptibly. He added that as soon as a dust collector was perfected that would be practical and could be installed with justice to stockholders and employes alike it will be put in.

A process such as was in use elsewhere would cost about a half million dollars and would require that the plant be closed from three to four months to install it, according to Mr. MacNider. He said that any kind of dust collector now in use in plants was not satisfactory and added that the wet process would not eliminate much dust—for this arises when the cement is crushed and the process does not help at that time.

Colonel MacNider stated that an effort would be made to keep the plant open throughout the winter. There are approximately 1200 persons living on the wages paid at the plant. This equals nearly 6% of the total population of Mason City.

The attention of the council was called to the cement dust matter by a petition signed by some 2000 residents of Mason City.—*Mason City* (Ia.) *Globe-Gazette*.

New Airports Planned

ESTABLISHMENT of seven airports in seven states and improvement of one previously constructed airport in another state is contemplated, the Aeronautics Branch of the Department of Commerce announced November 8 in making public the weekly airport bulletin.

Airports proposed: *Brinkley, Ark.; Bell, Calif.; Lexington, Ky.; Manistee, Mich.; Dickinson, N. D.; Scranton, Pa.; Cleveland, Tenn.; Galveston, Tex.

Airports established: Corning and Suffinsville, Calif.; Valdosta, Ga.; Caldwell, Idaho; Engham, Ill.; Kokomo, Ind.; Pittsburg, Kans.; Middlesboro, Ky.; Duluth, Minn.; Mount Healthy and Shelby, Ohio; Burns and North Bend, Ore.; Pittsfield, Penn.; Stamford, Tex.

Projects indefinitely postponed: Monroeville, Ala.; Blytheville and Warren, Ark.; Colfax, Galt and Sanger, Calif.; Willimantic, Conn.; New Smyrna, Fla.; Americus, Ga.; Rexburg, Idaho; Griggsville, La Salle and Peoria, Ill.; Sigourney, Iowa; St. John, Kan.; Biddeford, Me.; Plentywood, Mont.; Bridgeport, Neb.; Las Vegas, N. Mex.; Avalon, N. J.; Jay, N. Y.; Crosby, N. Dak.; Danville and Tarentum, Penn.; Dickson, Tenn.; Charlotte, Honey Grove and Plainview, Tex.; Waterbury, Vt.; Farmville and Portsmouth, Va.; Laramie and Powell, Wyoming.

*Already established, for which improvements are contemplated or under way.

Pittsburgh Plate Glass Loses Three Prominent Officials in Mine Accident

ROBERT D. PARSONS, general superintendent, Columbia Cement division of the Pittsburgh Plate Glass Co., who was killed November 5 in the disaster at the mine of the Sunday Creek Coal Co. at Millfield, Ohio, was born at Akron, Ohio, in 1885, of an old New England family from which came a number of colonial governors and some of whose descendants later settled in the Western Reserve. His father was William Cheney Parsons, of Brimfield, Ohio, and his mother Sarah Seymour, daughter of Professor Seymour of the Western Reserve College at Hudson, Ohio.

After finishing at the University School at Cleveland, Mr. Parsons attended Carnegie Institute of Technology at Pittsburgh, from which he was graduated as an electrical engineer. He was a well-known member of the Beta Theta Phi fraternity. His first position was with the Diamond Rubber Co. at Akron. After the Diamond company was absorbed by the B. F. Goodrich company Mr. Parsons was appointed technical manager of their plant at Paris, France, which he held until 1924. He was appointed to his position in charge of the Columbia cement plant at Fultonham at that time.

During the world war Mr. Parsons responded to the call by enlisting in the United States navy for a term of four years. He was universally liked by superiors and shipmates and won promotion to the rank of lieutenant, senior grade.

Mr. Parsons was very active in affairs affecting the welfare of the cement industry, particularly as related to the operating end. He was a member of the Committee on Conservation of the Portland Cement Association and attended its meetings as well as the general sessions of the association faithfully. Among his associates in this work he was regarded as having a particularly fine technical mind and an aptitude for mechanical problems. In the field of accident prevention he was conspicuous and had taken a prominent part. As a leader of men he was acclaimed generally for his gentleness and his ability to produce results.

Mr. Parsons impressed all who knew him as a gentleman of the highest type. He had the gift of acquiring many friends and he retained as such all who had the good fortune to know him. At the family home in Zanesville there survive him his widow, Mrs. Dorothy Galt Parsons, and two sons, Hugh Galt Parsons, 14, and Robert Day Parsons, 11. He is also survived by his mother, two sisters and a brother, the latter William R. Parsons of Bennett, Parsons and Frost, architects, Chicago. Mrs. Parsons is the daughter of Mr. and Mrs. Hugh A. Galt, the latter vice-president of the Pittsburgh Glass Co.

The accident in which Mr. Parsons lost his life was widely reported in the daily press. Mr. Parsons, with Thomas Trainer, traffic manager of the company, and Vernon Roberts, plant chemist, were at the Millfield mine on business and entered the mine with the president, vice-president and other officials of the coal company. An explosion

Robert Day Parsons

issued almost immediately in which Mr. Parsons, Mr. Trainor and Mr. Roberts were all victims along with the coal company officials and about 80 miners.

Thomas B. Trainer

Thomas B. Trainer, traffic manager of the Pittsburgh Plate Glass Co., Columbia Chemical Division, was a native of Ohio, having been born at Zanesville in 1891. He was a brilliant student at Ohio State University, where he studied law and engineering and was a member of the Chi Phi fraternity. For several years after leaving school he was employed by the Mark Manufacturing Co. at Chicago, returning to Zanesville to enter the employ of the W. W. Harper Co. Later he became manager of the Zanesville office of the Winkleman Brokerage Co. On May 1, 1924, he entered the Pittsburgh Plate Glass organization as traffic manager, which position he held until his untimely death.

Mr. Trainer is survived by his widow, Mrs. Marie Blundy Trainer; his mother, Mrs. Adelaide Trainer of Zanesville, a sister and a brother. He was well known in local cement and traffic circles and everywhere liked and respected.

Vernon Lyle Roberts

Vernon L. Roberts, foreman and chemist of the Columbia Chemical Division of the Pittsburgh Plate Glass Co., was born in Fultonham, the little Ohio city in which the Columbia cement plant is located, in 1893. He attended the public schools in Fultonham and later the Meredith Business College at Zanesville. After graduating he found employment with the Kehota Mining Co., where he remained until 1920. In December of that year he was employed by the Pittsburgh Plate Glass Co., Columbia Chemical Division, at Fultonham.

He was an employe of unusual intelligence and faithfulness and worked up through the ranks to the position of foreman at the cement plant and had what appeared to be a very promising future ahead. Mr. Roberts was an interested participant in all of the plant activities and was chosen director of the Columbia Athletic Association, which prospered under his able leadership.

Mr. Roberts is survived by his widow, Anna Phillips Roberts, and by a son, Lyle, aged 12, and a daughter, Betty Anne, aged 12; also by his father and mother, Mr. and Mrs. Lincoln Roberts, and a sister, Mrs. Howard Spring, all of Fultonham.

Soichiro Asano—An Appreciation

By Paul C. Van Zandt

Assistant to the President, Universal Atlas Cement Co., Chicago, Ill.; Former Chief Engineer, Asano Portland Cement Co., Tokyo, Japan

IT IS WITH GREAT SORROW that I have to announce the death of Soichiro Asano, president of the Asano Portland Cement Co., Tokyo, Japan. Mr. Asano died November 9 in Tokyo. He was 82 years of age.

The Asano Portland Cement Co. was started in 1883 and is the third largest producer of cement in the world. Mr. Asano's life was an exceedingly active and romantic one. He started with nothing but the will to succeed, when he was a young man, and he built up not only the cement company but the shipping company, Toyo Kisen Kaisha, a great fleet of fine passenger and freight steamers providing transportation from Japan to every port in the Pacific and around the world. He was also head of a ship-building company, a steel plant, and was interested in the banks of Japan, the mining of coal and iron ore and in the reclamation of large areas of land in Tokyo Bay.

Mr. Asano was one of the great industrial leaders of his time and one of the greatest in the Japanese Empire. His affairs will be left in the hands of his several sons who have already shown great ability in the handling of these large business enterprises, but his death is a great loss not only to Japan but to the world.

My personal association with Mr. Asano from 1916 to 1923 was the most pleasant experience of my life, and from that time I have felt that I owed him a debt of gratitude which I should never be able to repay. He was a tremendous worker with a remarkably keen and quick intelligence and he will be remembered by all those with whom he was associated for his unfailing kindness and generosity. I am proud to give this testimony for this great man whose personal friendship I have valued so highly.

Harry E. Brookby

THE ROCK PRODUCTS industry, and the lime industry in particular, suffered a severe loss in the untimely death, November 15, of Harry E. Brookby, consulting chemical engineer, of Chicago and Evanston, Ill. He died as the result of an operation for cancer at the age of 47. His work in recent years had been in the way of practical research leading to the development and perfection of gypsum, lime and cement mortars, and his work in lime, particularly, was in a fair way to have greatly benefited the entire industry in the near future.

It was the editor's privilege to have a long talk with Mr. Brookby on the day before he went to the hospital to prepare for his operation; for the editor had long enjoyed and profited by an intimate friendship, and was aware of the work under way and in prospect, and in sympathy with it. It would be impossible to pay an adequate tribute in words of pen or tongue to this man, who faced a crisis in life that few of us probably are ever called upon to face. He knew full well the seriousness of his condition and his chances of recovery, yet he was calmly and cheerfully philosophic about it and about life in general, as all who knew him well can understand. He faced death, we know, as bravely as any hero of history —and he knew death meant to him parting with a dearly beloved family and a dearly beloved work.

His earnest hope was, we know, that the line of research he had started in these industries might be continued, because it has already and will continue to bring practical, successful results. His only sign of discouragement was because of the prospect that his own work would be interrupted, and very possibly cut off, and his work was intensely interesting to both himself and his interviewer. He was then definitely planning to make available through writing, that he could do so well, some of the vast fund of special knowledge he had accumulated in his crowded years of business and professional experience. There was indeed much invaluable experience and digested knowledge lost to the industry in his untimely death.

Harry E. Brookby was born 47 years ago in Lafayette, Ind. His family name was Bachtenkircher. He graduated from Purdue University in 1903, and soon after specialized in the rock products industries—one of the first technical graduates to enter the lime industry. He will be remembered by old-time lime manufacturers as a frequent contributor to their proceedings in the National Lime Manufacturers' Association, the forerunner of the present National Lime Association, under the name of Bachtenkircher. He was manager of the Dolese and Shepard Co.'s lime plant in Chicago in those days; later general superintendent of the Chicago Lime Co.

He early set himself about finding the reason for plasticity in dolomitic limes, and his contributions to Rock Products in 1917 and 1918 on the then new product, hydrated lime, remain a scholarly and lasting piece of work. From that time to the present the nature of his work, and his relations with employers and clients were such that he was not free to write; but as already stated he was about to resume his literary work, and we of Rock Products, at least, know that this would have been invaluable to the industry.

During the World war he was very actively engaged in various chemical works construction, particularly those looking to a successful method of potash recovery, which

H. E. Brookby

was so important to this country at that time. This work took him frequently to Canada, as well as about this country, and he found his German name somewhat of a handicap, particularly in his Canadian contacts. Being a native-born American citizen, he quite logically had his name changed to one more in keeping with those of other natives in the land of his birth.

Subsequently he was associated with H. D. Baylor, then superintendent of the Louisville Cement Co., in the research and development work which led to the manufacture and marketing of the mason's cement known now as "Brixment." From there he went to the United States Gypsum Co., Chicago, first on special research work and later to become manager of its research department and still later production manager. In this connection he was responsible for the development of many new gypsum and lime products, many patents being issued in his name. He was subsequently elected a director of the company.

A few years ago, having acquired a substantial fortune, for his modest requirements, he again engaged in the work that had always given him the greatest satisfaction and which he loved so dearly—an independent research and consulting practice. In this capacity he developed special mortar cements for the Century Cement Co., Rosendale, N. Y., the Western Lime and Cement Co., Milwaukee, Wis., the Bessemer Limestone and Cement Co., Youngstown, Ohio, and others. Very few men have ever acquired such an extensive and intimate acquaintance with the chemistry of gypsum, lime and cement.

He was a member of many engineering and scientific societies, of the Evanston Country Club, Westmoreland Country Club, Shawnee Club, Illinois Athletic Club, and others.

He is survived by his widow, Mrs. Edith French Brookby, 720 Central street, Evanston, Ill., and three children—Raymond, a junior at Dartmouth college, Harry Dudley and Doris Ellen, attending school in Evanston. His father and mother, who also survive him, reside in Lafayette, Ind.

Should Promote the Use of Lime as a Cure for This Condition

THE *Charleroi Mail* in a recent issue reported that Captain W. B. Rodgers, president of the McCrady-Rodgers Sand Co., Pittsburgh, Penn., gave out the statement that every effort will be made in the next legislature to stop stream pollution, in commenting on the enormous loss to steamboat boilers caused by the acid in the rivers which has been increased by the long drought.

The captain gave out an estimated figure of $200,000 during the last season; he also asserted that formerly steamboat boilers constructed of the best steel possible and under the strict supervision of United States steamboat inspectors had a life of 20 years, now it is necessary under the condition in the river to replace them every eight years or less.

Glue factories and pulp mills operated on the head waters of our rivers are the chief source of the high acid condition in the rivers today, it was said.

Not only do steamboat boilers suffer from the acid in the rivers but hulls of all steamboats and other parts of the lower works suffer from the same cause.

Another inroad made on iron and steel machinery was noted this week at Lock No. 4, where the turbine wheel used to furnish the motive power to operate the air compressors was so badly damaged and eaten up by acid as to necessitate its removal. A new turbine is being installed and will be in operation.—*Monongahela* (Penn.) *Reporter.*

This looks as if the lime industry could get some effective support in promoting the use of lime for neutralizing these acid stream waters.—Editor.

Polished Granite and Crushed Stone from Same Wisconsin Quarry

CONSIDERABLE EXPANSION and installation of machinery is being done by the Hub Granite Co. at Cary Bluff, Wis., according to the report of a *Marshfield* (Wis.) *News-Herald* representative who visited the plant recently. Polishing and stone cutting machinery has been installed in a building recently erected for that purpose, and they are expected to be in operation within a month.

Prior to this time the company has sent the stone quarried to other concerns, who polished it and put it in condition for the consumer. With the new department they will be able to condition the stone for the cemetery, if desired.

Last spring a stone crusher was added to the company's equipment which furnished a large amount of crushed rock for road work throughout the vicinity.

A shed for cooking and sleeping quarters was also just added to the buildings on the grounds of the concern. It is their plan to have two or three men on the grounds all the time.

Ideal Sand and Gravel Company, Mason City, Iowa, Has Record Year

EIGHT THOUSAND CARLOADS, a mountain of sand and gravel, were shipped from Mason City, Iowa, this season by the Ideal Sand and Gravel Co.

This is an increase of 15% over last year and constitutes the record year of the company's impressive history.

This sand and gravel, which is dug by the latest type of machinery from the vast stores left by glacial action millions of years ago, was shipped to all parts of Iowa and parts of Minnesota and played an important part in Iowa's 1000 mile pavement program the past season.

The Mason City plant supplied the fine and coarse aggregate that went into the paving of the 17 miles of Freeborn county highway that connected the two farflung pavement systems of Minnesota and Iowa and closed the gap for the celebration of the completion of the Jefferson highway through the two states.

Considerable material was supplied the George A. Hormel Co. at Austin, for an addition to the filtering plant and other construction projects. The Ideal Sand and Gravel Co. is shipping material for the erection of the new high school at Algona. It provided the aggregate for numerous building projects at Marshalltown and shipped the sand and gravel used in the expansion program of the Oliver Farm Equipment Co., at Charles City.

The plant supplied the fine and coarse aggregate for 70 miles of pavement in Iowa, including special paving projects in Charles City and Osage.

To put out this tremendous amount of material the company, which is headed by Grant McGowan, employed a larger number of men this year than ever before. The crew numbered up to 55 men at the peak of the season. The average number of cars a day for August was 70, a new high record.

To prepare this product for the market the Ideal Sand and Gravel Co. used more water than consumed by the entire city of Mason City during the same period. The plant in operation uses 3200 gal. per min. The water is pumped from the McGowan pond through a 12-in. pipe line by four electrical pumps. The pond holds 18,000,000 gal. and this year proved to be one of the most successful bass nursery ponds in the state. A total of 35,000 fingerlings were taken from the pond this fall to stock Clear Lake, and plans are being made to further improve the project for next year.

With the promise that Iowa's pavement program is to be continued the Ideal Sand and Gravel Co. is making plans to restock the plant with repairs and equipment for a similar season next year. This will cost in the neighborhood of $20,000.

Notwithstanding the heavy campaign that has been carried on the past season, the company has maintained 60,000 tons of material on hand for winter demands. The plant usually runs until the ground freezes up.—*Mason City* (Ia.) *Globe-Gazette.*

Popular Lectures on Special Steels

G. VAN DYKE, manager of the special steels department, Joseph T. Ryerson and Son, Chicago, Ill., has been delivering a number of lectures at various points throughout the country on alloy steels, tool steels and stainless steels. Recent meetings have been held in Minneapolis, Cincinnati and Milwaukee, where he spoke to about 200 engineers and shop men on each occasion. The lectures usually cover the better part of a day.

The talk and demonstration which was originally prepared for Ryerson salesmen and service men covered two days, but has now been boiled down to about three hours on the lecture and two hours on practical demonstration and instruction including welding.

The entire lecture and demonstration is of a strictly non-technical character and is given in such a way as to be clearly understandable by superintendents, shop foremen, welders and others who may or may not have had technical training. All charts and tables used in the lecture are reproduced in mimeograph form and are supplied to all those attending the lecture.

Further meetings are planned for various principal cities throughout the country, particularly where customers or others interested have asked for meetings.

Bids for Operation of La Salle (Ill.) City Gravel Pit

THE MATTER OF THE LEASING of a section of the city gravel pit plot east of the city of LaSalle, Ill., for the building of a gravel plant and a right of way to gravel deposits beyond the city property, which has been hanging fire for some time, finally came to a head recently when the city council held a special meeting.

Bids from the Western Sand and Gravel Co. of Spring Valley, and F. W. Nelson, of Grand Rapids, Mich., for the lease-rights were opened and read. Action on these bids was delayed by motion for one week, pending investigation.

Mr. Nelson indicated in his bid that his company intended to erect a plant and equipment for the purpose of preparing sand and gravel for market and wished to lease the city property on which to place this plant, all equipment, buildings and switch tracks which would be necessary. The proposition stated that none of the city gravel would be removed and that the present road to the city pit would be maintained. The period of the lease was for 10 years with an option of an additional five at the close of that period.

In remuneration for the right to use the city property, Mr. Nelson stated that his company would deliver to the city at the pit 1000 cu. yd. of gravel annually and any additional gravel the city would require at 65 cents per cu. yd.

The bid of the Western Sand and Gravel Co. stated that they would duplicate whatever proposition was offered by Mr. Nelson and in addition would deed to the city a plot of ground consisting of three acres, between the C. B. and Q. railroad and the Northwestern railroad tracks, suitable for a city park and a swimming pool and that it would assist in clearing and improving the plot and landscape for this purpose.—*LaSalle* (Ill.) *Post.*

Geologic Map of Arkansas

A VERY FINE NEW topographic and geologic map of the state of Arkansas to a scale of 1:500,000 has been received from the Arkansas Geological Survey, George C. Branner, state geologist.

In addition to showing contours and highways, the oil and gas fields, power transmission lines and oil and gas pipe lines of the state have been included. The various mineral industries have also been indicated with symbols to show the location of plants and mines producing cement, lime, stone, sand, gypsum and other minerals.

The topographic mapping was done by the United States Geological Survey in co-operation with the Arkansas Geological Survey, the highway data furnished by the Arkansas State Highway Commission, and the industrial data by the Arkansas Geological Survey.

Royalty on Iowa Gravel Property 7-4 Cents

THIRTY-FIVE or more acres of land are involved in a deal between Myron Hill and the Northwestern railroad, owners of gravel deposits east of Sutherland, Iowa, and E. H. Laudenbaugh, contractor, whereby the gravel there is to be taken for use in paving. In closing the deal Mr. Hill was given a preliminary cash payment for the gravel on his land and provision was made for the purchase of the first 200,000 cu. yd. at 7 cents per yard. While the exact quantity of the deposit is unknown, it is estimated at about 2,000,000 cu. yd. The contractors bought the amount in excess of the 200,000 cu. yd. at 4 cents per yard.

This land lays on both sides of the Northwestern railroad and consists of about 35 acres. Between the two pieces owned by Mr. Hill the railroad passes. The contractors also obtained the right-of-way, a strip 300 ft. wide, and will dig there as well as on Mr. Hill's land, according to plans.

In making the survey some time ago engineers dug holes to a depth of as much as 20 ft. in some places and found a good grade of gravel in all of them. Samples were then tested for shale content and passed as satisfactory. According to specifications, there cannot be more than ½ of 1% shale. Several years ago tests were made on some of this same ground, but they were not so extensive as the recent diggings and did not disclose such a large area of good gravel.

The land is particularly well located for working. The Little Sioux river is only a short distance from either end of it, a condition which makes the deposit all the more favorable for working since water is used for washing the gravel.

At the present time it is not known definitely whether the work will begin here this fall or in the spring, but when it does a large force of men will be required, probably 50 or 75. Switch tracks will be necessary and also the extension of the high line to furnish power. Such an undertaking almost represents a town in itself, and should prove to be quite a boom for this section.—*Sutherland* (Iowa) *Courier.*

Virginia Crushed-Stone Man to Make Asphalt Paving Mix

W. F. CULBERT AND SONS, Marion, Va., are planning within the next six weeks the beginning of erection in Marion of what will be one of the largest asphalt pre-mixing plants in the entire South. The erection of the Marion plant will be followed, according to present plans, with erection of a similar plant at Lynchburg.

The Marion plant will be built adjacent to the present quarry. It will be in four big, all-steel units. The units are a drying plant, a boiler plant, a screening and weighing plant and a tower mixing plant, 60 ft. in height.

The plant, when in full operation, is expected to eventually consume most of the stone produced in the present quarry, with the exception of the commercial grades of limestone. With the start of operations, which will be in the early spring, the present quarry force of about 30 men will be doubled and additional quarry machinery will be installed.—*Marion* (Va.) *News.*

Atlantic Gypsum Products Co.'s Plant Threatened by Fire

FIRE which for a time threatened to destroy the plant of the Atlantic Gypsum Products Co. at Freeman's Point, Portsmouth, N. H., November 9, was finally confined to building No. 6 at a loss estimated at $125,000.

The fire, which was the most spectacular for years in that section, drew thousands of spectators to the scene as the clouds of smoke could be seen for miles. The Portsmouth department summoned aid from York, the Portsmouth navy yard, Kittery and Eliot, all of which sent pumping engines.

The fire started in the lower floor of the building and was discovered early, but lack of water pressure let the fire get out of control. Fanned by a strong breeze, it spread through the long building and by the time the department reached the scene the plant was a roaring furnace.

The building, a three-story brick affair about 500 ft. long, was attached to the power plant but separated by a fire wall and all efforts were made to keep it out of this building and building No. 7 to the north. Both were damaged to some extent.

The building of the Atlantic Gypsum Products Co. was not damaged.

Capt. Peter Holm of the Norwegian steamer *Lorentz W. Hansen,* which was discharging gypsum rock at the plant, was badly burned while fighting the fire. He fell 18 ft. into an excavation and was taken to the Portsmouth hospital with a wrenched knee. The loss on the building is estimated at $75,000 and on the machinery.—*Newburyport* (Mass.) *News and Herald.*

It will be recalled that the Atlantic Gypsum Products Co., at Portsmouth, N. H., occupies some of the buildings erected during the war by the War Industries Board, and subsequently unoccupied. Evidently the fire was in one of these unoccupied buildings.

New Gravel Plant for Texas

ONE OF THE LARGEST sand and gravel plants in southwest Texas has just been opened by the Woodlawn Gravel Co., 8½ miles from San Antonio. The gravel deposit covers 110 acres, and the plant, just completed, represents a total investment of $100,000.

This plant was placed in operation early in November, and, according to the owners, approximately 100 trucks shortly will haul material for building projects.

The property recently was leased from W. B. Tuttle for a period of five years, the consideration being $75,000. A complete excavating, crushing and washing outfit has been constructed. The plant is of steel and concrete construction and is fireproof.

The deposit of gravel is one of the largest in that part of the country, test holes indicating that the formation is fully 35 ft. deep, and covers practically the entire site.

The products are divided into three sections, one outlet being of coarse rock for rough construction work, a second being a fine gravel and the third, an excellent grade of sand suitable for any kind of building.

Magnesite Refractory for High Temperature

MAGNESIDON, a new refractory material made of magnesite, is being introduced by the American Demag Corp. The magnesite used in making this material contains 95 to 98% magnesia and 1 to 2% iron. The brick are said to be burned at a temperature of at least 3500 deg. F. and the iron acts as a bond.

The brick are said to be insensible to changes in temperature, to have a very high softening point and to be chemically inert against metallic vapor basic and semi-basic slags.—*Ceramic Industry.*

Gypsum in 1930—Third Quarter

THE FOLLOWING table shows the result of a canvass by the United States Bureau of Mines, Department of Commerce, of the principal operators in the gypsum industry to show the quarterly production, imports and sales of gypsum and gypsum products in the United States:

QUARTERLY PRODUCTION, IMPORTS AND SALES OF GYPSUM AND GYPSUM PRODUCTS IN THE UNITED STATES IN 1930 AS REPORTED BY OPERATORS

		First quarter	Second quarter	Third quarter
Number of operators reporting		26	26	28
Crude gypsum mined	Short tons	697,441	962,978	859,751
Crude gypsum imported (as reported by importers)	Short tons	(*)	253,960	339,934
Crude gypsum sold (domestic and imported)	Short tons	169,076	285,063	294,249
Calcined gypsum produced from domestic and imported rock	Short tons	571,973	682,117	609,868
Calcined gypsum products sold from domestic and imported rock:				
For pottery, terra cotta, plate glass, mixing plants, etc.	Short tons	54,287	49,952	43,560
Keene's cement	Short tons	10,404	10,441	11,094
Neat, wood fiber, sanded, gaging, finish plasters, etc.	Short tons	374,557	468,139	444,141
Wall board	Square feet	113,751,111	140,911,403	92,798,729
Plaster board	Square feet	57,140,843	68,294,655	62,874,517
Partition tile	Square feet	7,255,524	6,883,527	5,868,652
Roof tile	Square feet	686,142	1,074,242	(*)
Other tile	Square feet	(*)	(*)	(*)
Other calcined gypsum sold	Short tons	3,664	3,415	4,307

(*) Less than three operators reporting.

Scenes at the launching of new Universal Atlas barge in Chicago. The group of officials in the left-hand photograph, from left to right, comprises James D. Scovel, district sales manager; W. L. Greenly, district sales manager; T. A. Hicks, general chemist; E. M. Johnson, assistant treasurer; F. L. Stone, general sales manager; George Booth, special engineer; A. C. Cronkrite, assistant general sales manager; John Ahnfelt, operating manager; Paul F. Keatinge, manager Atlas White bureau; Paul C. Van Zandt, assistant to the president; E. R. Gustafson, assistant traffic manager; H. G. Farmer, technical service director; H. P. Reid, special engineer; S. J. Robison, assistant chief engineer; E. D. Barry, assistant operating manager; B. F. Affleck, president; M. A. Berns, publicity manager; Frank E. Guy, traffic manager; B. E. Schroeder, local auditor; A. G. Carlson, chief engineer; E. A. Helgans, purchasing department; A. W. Lyon, purchasing department; Harry A. Craig, district sales manager; J. H. Kempster, general superintendent, Buffington plant; R. L. Walsh, electrical engineer; William C. Hennebohle, master mechanic; E. D. Hollinshead, construction superintendent; J. B. Lewis, assistant general superintendent, Buffington plant; O. C. Anderson, mill superintendent at Buffington, and E. O. Elliott, mill superintendent at Buffington. In the other picture, Jane Affleck, nine-year-old daughter of the president of the Universal Atlas Cement Co., christens the new barge at its launching in the Chicago river. From left to right are shown A. G. Carlson, chief engineer; Paul C. Van Zandt, assistant to the president; James D. Scovel, district sales manager; Mrs. B. F. Affleck; President B. F. Affleck; F. L. Stone, general sales manager, and Jane Affleck

Self-Unloading Barge for Universal Atlas Cement Launched

A NEW SELF-UNLOADING BARGE, which will be used by the Universal Atlas Cement Co. for the transportation of bulk cement from the plant at Buffington, Ind., to Milwaukee, Wis., and other lake ports, was launched at Chicago, November 15, and on November 19 left the Buffington plant bound for Milwaukee with its first cargo of cement.

The launching was at the plant of the Illinois Steel Warehouse Co., where the barge had been assembled, and was under the direction of S. J. Robison, assistant chief engineer of the cement company, who had charge of the building and equipping of the boat. In the presence of a large crowd, including officials of the company, the vessel was christened by Jane Affleck, the 10-year-old daughter of B. F. Affleck, president of the company.

The principal features of the boat are that it is equipped with self-unloading machinery which is motor driven with power from shore, and that it has an overhead clearance of 12½ ft., which permits passing under city draw bridges without raising them.

The vessel is a riveted steel tow barge, 226 ft. long and of 40 ft. beam, with a carrying capacity of 9000 bbl. of cement, or approximately 1800 tons, which can be unloaded in about 10 hours.

Unloading is done with the Leatham D. Smith tunnel scraper system in connection with a Fuller-Kinyon pump, which forces the bulk cement through a pipe to the storage silos on shore. A single centrally located longitudinal tunnel the length of the cargo space is built into the hold and arranged with doors on the sides so that the cement may feed into the tunnel. In this tunnel a 4-yd. drag scraper is used, operated by cables and hoist, to carry the material to a hopper feeding a 10-in. Fuller-Kinyon pump, incidentally the largest pump of this type yet installed. The pump and also the air compressor used in connection with it are driven by direct-connected electric motors which receive their power from shore. In the tunnel the scraper is so arranged that the backhaul cable passes through a trolley running along the top of the tunnel, thus lifting the back end of the scraper over the top of the material while it is being hauled back.

Loading of the vessel at the Buffington plant is accomplished in about the same length of time by the Fuller-Kinyon system operating through a 10-in. line about 1100 ft. long, the largest and longest discharge line of any similar installation.

Bethlehem Mines Corp. Building New Crushing Plant in Eastern Pennsylvania

ONE of the most extensive operations which has been started in Upper Merion township, Pennsylvania, for many years is now under way at the Bethlehem Mines Corp. in the vicinity of Shainline Crossing.

Officials of the company said recently the total cost of the construction work now in progress, including the large tracts of ground purchased in recent months, would reach $1,000,000.

Buildings now under construction are a crushing plant, a screening house and a washing plant. An up-to-date machine shop with all modern equipment will be built.

All construction work is being done by the Bethlehem Steel Corp., of which the Bethlehem Mines Corp. is a part. William A. Rankin is in charge of the construction work. James C. Ford is superintendent of the local quarries.

All quarry output will be marketed as a valuable product upon the completion of the new plant. While most of the output is used by the Bethlehem Steel Co. at its various plants for fluxing purposes, the Upper Merion quarries will also enter the local commercial field upon the completion of the present building operations. It is expected the work will have been completed in the summer of 1931. The building being erected covers an area of about two acres.

The Bethlehem Mines Corp. is located on the former McInnes and David quarries. Its present land holdings are extensive, however, as large tracts were recently transferred to the company from the Rossi interests and the Chester Valley Railroad Co.

This section of Upper Merion township has grown considerably as an industrial center. The pioneer industry of the vicinity was the Ellis Concrete Block Corp. The Air Reduction Co. is also located in that vicinity and another progressive company, the Thompson-Weinman Co., is not far distant. The Hutchinson Manufacturing Co. has a modern new plant abutting DeKalb pike and in the rear of this the supply base of the Standard Oil Co. for this section is located.—*Norristown* (Penn.) *Herald.*

Self-unloading sand and gravel dredge and carrier for the Construction Materials Corp., Chicago, Ill.

New Self-Unloading Bulk Carrier for the Great Lakes

A NEW LAKE CARRIER of advanced design and with a number of unique and interesting features is that just put into service by the Construction Materials Corp., Chicago.

This vessel, the *J. R. Sensibar,* named after the president of the Construction Materials Corp., who is also chairman of the board of the recently formed Moulding-Brownell Corp., was completed at Lorain, Ohio, November 10, and at the time of going to press was on its way to Chicago with its first cargo.

With appropriate and impressive ceremonies, and in the presence of a party of 100 prominent officials and marine men, the machinery was started through radio control by David E. Shanahan, speaker of the Illinois House of Representatives and vice-president of the Construction Materials Corp., from the company's offices in Chicago.

The *Sensibar,* formerly the *Frank C. Ball,* was almost completely rebuilt at the yards of the American Shipbuilding Co., Lorain, Ohio, and is said to represent an investment of approximately $2,000,000. It is expected that the boat will handle during the coming season a million tons of sand and gravel from the company's Ferrysburg, Mich., plant to the docks of the Moulding-Brownell Corp., at Chicago, in addition to a large amount of sand fill work on the large land-building projects of the Newton Steel Co. at Monroe, Mich., and the Great Lakes Steel Co. at Detroit.

It is also anticipated that the machinery and methods used will permit the handling of bulk materials at the lowest costs.

The vessel is 556 ft. long over all, with a beam of 56 ft. and a cargo carrying capacity of approximately 10,000 tons, which can be unloaded in from three to five hours, depending upon the material. In addition to loading such cargoes as stone, coal, sand and gravel through the hatches in the usual way, a cargo of sand and gravel may be dredged from the lake in about the same length of time by means of two large centrifugal pumps, and may be unloaded in the same way by pumping ashore through pipe lines.

For unloading a cargo of stone or coal a system of belt conveyors is used, consisting of two parallel longitudinal conveyors below the cargo hold, an inclined conveyor and a swing-boom conveyor, which piles the material on the dock. Each conveyor as well as the large pumps are driven by direct-connected electric motors, power being furnished by a 3000-kw. 2300-v. General Electric turbo generator. The propeller shaft is driven by a direct-connected 3000-hp. General Electric motor. Steam is generated in three Scotch marine boilers, using powdered coal as fuel, and the power plant includes the most modern, practice using superheated steam and condensing equipment. All equipment is arranged with automatic electric control.

The boat was designed by H. N. Herriman, vice-president of the American Bureau of Shipping, with C. N. Rudow, Chicago, as consulting engineer. Captain Harvey Bricker is in charge, with Anton Wirth as chief engineer.

Idaho To Have New Phosphate Plant

THE Idaho American Fertilizer Co., a $25,000 Idaho corporation, is putting in a fertilizer plant in Parma, Idaho, on a site purchased from the S. W. Morrison Lumber Co. in the west end of town along the railroad right of way. The building which is now under construction will be 40x50 ft.

Harry Jackson, president of the company, stated that the product to be manufactured here is known as the phosphate type and will be made principally out of an Idaho raw product mined in Bear Lake county at Paris. This product is known as tricalcium phosphate and carries three of the chief ingredients, or 72% of the total ingredients of a phosphate fertilizer. The United States geological survey has estimated the Bear Lake county deposits at five billion tons.

In addition to the raw product furnished by Idaho, nitrates shipped from Chili will be utilized, as well as sulphuric acid, shipped in tank cars from California. The raw rock will be ground at Paris and then shipped here for treatment with acids and then reduced to powder for commercial distribution.

Only two other similar plants are in existence west of the Rocky mountains, one at Los Angeles and the other at Anaconda. The local company already has orders for seven carloads of its products, President Jackson said. C. V. Cottier is secretary-treasurer of the company.—*Boise* (Ida.) *Statesman.*

Progress on British Columbia Phosphate Plant

THE FIRST UNIT of the great plant for the production of chemical fertilizers, being erected by the Consolidated Mining and Smelting Co. of Canada within the Tadanac, site of its metallurgical works, near Trail, B. C., will be producing by January 1, according to an estimate.

The construction in hand, which involves an outlay of approximately $10,000,000, will realize the first unit of a new manufacture that is believed to have unbounded possibilities, says the *Nelson News.* It is even anticipated that it may some day equal in importance the Consolidated's metal-producing activities, which supply, or can supply, a tenth of the world's requirements in lead and zinc, not to speak of less imposing contributions.

The new industry, whatever its eventual size, will bear a by-product relationship toward the great metallurgical business that has made Trail famous.

A source of lime-phosphate has been found by Consolidated engineers at Crows Nest and Fernie, B. C.

Another Ohio Cement Plant Rumor

IT IS REPORTED that 200 acres of land a short distance north of Greenfield, Ohio, is under option to a large eastern concern, supposedly for the limestone the tract contains. It is said that if plans now under way materialize a large cement manufacturing plant will be erected on the land. Geologists and representatives of the company have been working in that vicinity for three or four weeks.—*Columbus* (Ohio) *Dispatch.*

Limestone Gets Some Unusual and Favorable Publicity in Cheyenne, Wyo.

THE FOLLOWING newspaper story under the caption "Big Limestone Mine Almost in Cheyenne's Dooryard Is Virtually Unknown Locally" appeared recently in the *Cheyenne Tribune*. We reproduce, practically entire, not merely because it is really quite interesting to the quarry operator reader, but because it is an excellent example of the kind of publicity that is helpful to the quarry industry, through making the general public better acquainted with it and its products. The story follows:

"AGES AND EONS AGO, as Rudyard Kipling would say (and whatever that may mean), the Laramie county plateau was the bed of a fresh-water sea.

"This sea swarmed with foraminifera, microscopically tiny animalcules equipped with shells, which lived their little lives and died and sank to the bottom in multitudes so countless that even 'astronomical figures' are inadequate to express their multiplicity.

"Millions, billions, trillions, quadrillions, quintillions (let's jump, say, to decillions, and let it go at that) of the infinitesimal calcareous mites gathered on the bottom, forming first an ooze, then layers and finally a bank, which under tremendous pressure became what we know as 'limestone.'

"In time the sea dried up or drained away, the region which it had occupied was subjected to terrific convulsions and in places the strata which had formed in its bed were tip-tilted and left standing on edge.

"Today these torn leaves of the 'book of creation,' now virtually vertical, project as what are called 'the Horse Creek hog-backs.'

"There the intelligence of man—himself perhaps evolved, like megatheriums, mastodons and mice, from the same plasmic ooze in which stirred the beginning of the foraminifera—is taking advantage of the effect of the natural processes herein so baldly sketched, is tearing to pieces the mighty 'leaves' of limestone and is utilizing the fragments in one of the scientific creations of his marvelous mind, the manufacture of sugar from beets.

"Which brings us to the 'spot news' fact that the Ingleside Limestone Co.'s quarry near Horse Creek station, 35 miles northwest of Cheyenne, is outputting 400 tons of limestone daily, for use in refining processes at factories in this region of the Great Western Sugar Co., including the brand-new, ultra-modern refinery recently opened at Wheatland.

"Forty men are employed in getting out this rock. Their 'pay roll' is an economic item of importance to Cheyenne. They have money to spend and this city, but an hour's journey from their habitat (thanks to a good country road which is being made better), is the most convenient, the logical place at which to spend much of it.

"Too, the railroad freight tonnage provided by the limestone output is of importance to Cheyenne—that limerock industry of the Horse Creek 'hog-backs' is a valuable resource, which undoubtedly will become far more so, to have in a city's 'front yard.' Cheyenne should pay more attention to it.

"Which brings us to another point, best emphasized by interrogatory introduction:

"How much, if anything, does the average Cheyenneite know about the Horse Creek limerock industry?

"How many have visited the Ingleside workings, or the quarries on other 'hog-backs' of the row which looms so spectacularly westward of the railroad between Horse Creek and Altus stations?

"How many know that tucked away in the mouth of the gorge via which Horse Creek circumvents the 'hog-back' barrier there is a model industrial village—with a pressed brick hotel as big as a Cheyenne business block, pressed brick apartment houses with the modern conveniences, concrete curbed and guttered street, substantial school, its own railroad yards (both broad and narrow-gage), garage row, towering crusher, sorter and loading plant, etc., etc.?

"That's sufficient of the interrogatory to make the point, now for a little information for those Cheyennites, constituting perhaps a very big majority, the whole sum of whose knowledge of the Horse Creek limerock development is that there's a quarry somewhere up in the Horse Creek country. There is more than a quarry, there are several quarries, and in addition there is the Ingleside workings, which is not a 'quarry,' but a 'mine'—a limestone mine. The distinction is that a quarry is an excavation which is open at the top and a mine a subterranean excavation.

"The Ingleside development not only is a mine, but is a good-sized mine. There is 5000 ft. of tunnel and it is a big tunnel—big enough for the operation in it of tram cars which take several tons of rock at a load. These cars are linked in trains which are moved by a gasoline motor. The tunnel cross-cuts a 'hog-back' (the biggest of the lot), for 1300 ft., then branches to north and south and follows the course of the limestone veins, with the effect that it has the form of a gigantic 'T.' The veins are worked through stopes (chambers extending upward from the tunnel) at intervals of 38 ft. The limestone is blasted from the top of a stope and drops to a bin in the tunnel, and thence into cars. The highest of the stopes extends 300 ft. above the roof of the tunnel. The crest of the 'hog-back' is 500 ft. above the tunnel. Several of the stopes have been extended upward 'to daylight' on the ridge's east slope. Power for drilling is compressed air. The formation is remarkably dry and so firm that very little timbering has been necessary. The 'fat streaks' contain 90% or more of lime. All rock with a leaner lime constituent is regarded as waste.

"The outer terminal of the mine railway is at a towering tipple where the cars automatically are dumped and the limerock is sorted and screened. That 90% or more lime drops into standard railway cars for shipment to Great Western factories in Wyoming and Nebraska. The remainder goes to the waste dump.

"The waste makes a nearly ideal macadam. An experimental mile of the county road to Cheyenne is surfaced with it. Results have been so satisfactory that the surfacing will be extended to sections of the road where gravel for surfacing may not be obtained near at hand.

"The Ingleside development, which began 12 years ago, passed through two quarrying phases before the mine workings were started. Scars of the quarrying operations—roads and pits and remnants of an aerial tramway—are conspicuous far up the 'hog-back.' They may be seen from miles away.

"North of the Ingleside mine, on others of the chain of 'hog-backs,' are several quarries from which large amounts of limerock have been taken but none of which are being operated at this time. The largest are the property of the state of Wyoming (they are on a school section), and the rock is taken out by lessees on a royalty basis. One has been a source of supply for factories of the Holly Sugar Corp., the Great Western's rival in the beet sugar production field.

"A trip to the village of Ingleside, the mine there and the quarries farther north is well worth the time and trouble for Cheyenneites. Observation is illuminating and impressive. Something very big has happened, and is happening there, almost at the city's doorway, of which the townspeople with comparatively few exceptions virtually have been unaware. It's time they educated themselves regarding development so important in its bearing upon their city's fortune. The Chamber of Commerce wisely might arrange for an excursion and inspection by its members.

"The limestone dyke which projects at the Horse Creek 'hog-backs' extends far to the north and south. It is said to be, in fact, transcontinental, but it is at comparatively few places that it is exposed advantageously to commercial exploitation. One of these places is on the Granite Canon 'bridge' traversed by the Union Pacific railroad and the Lincoln highway. Others are in northern Colorado, west of Fort Collins and in the Lyons district. 'Jawbone,' the fantastic 'hog-back' 20 miles west of Cheyenne, is an exposure. So is Table Mountain, but there the limerock 'leaves' of the 'book of creation' are not upended but lie horizontally and constitute a mesa. A hundred miles to the north there are numerous exposures, which have been commercially exploited, in the Guernsey district."

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Attica and Franklinville, N. Y. (a)	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.15	1.15	1.75	.....	1.75	1.75
Buffalo, N. Y.	.....	1.05	1.05	1.05	1.05	1.05
Erie, Penn.	.80	1.00	.....	.....	.....	.....
Leeds Jct., Scarboro and South Portland Me., and Milton, N. H. (c)	.....	.50	.....	1.75	1.25	1.00
Machias Junction, N. Y.	.65	.65	.65	.....	.65	.65
Montoursville, Penn.	1.00	.70	.50	.40	.40	.40
Northern New Jersey	.20– .50	.20– .50	1.00–1.25	1.00–1.25	1.00–1.25	.....
Georgetown, D. C.	.55	.55	1.00	1.00	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.30	.20	.20	.35	.35	.40
Attica, Ind.			All sizes .75–.85			
Cincinnati, Ohio	.55	.55	.80	.80	.80	.80
Columbus, Ohio	.75–1.00	.50– .75	.60– .75	.60– .75	.60– .75	.60– .75
Des Moines, Iowa	.40– .70	.40– .70	1.50–1.85	1.50–1.85	1.50–1.85	1.50–1.85
Dresden, Ohio	.....	.60	.70– .80	.75	.75	.70
Eau Claire, Wis.	.40	.40	.50	.85	.85	.....
Elkhart Lake and Glenbeulah, Wis.	.40	.25	.50	.50	.45	.45
Grand Rapids, Mich.	.40	.40	.70	.70	.70	.70
Greenville, Ohio	.50– .70	.40– .60	.50– .60	.50– .60	.50– .60	.50– .60
Hamilton, Ohio	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75
Hersey, Mich.	.....	.40	.....	.70	.70	.70
Humboldt, Iowa	.....	.45	.....	.....	1.25	.....
Kalamazoo, Mich.	.....	.50	.50	.60	.65	.....
Kansas City, Mo.	.70	.70	.80	1.50	.....	.....
Mankato, Minn.	.55	.45	1.25	1.25	1.25	1.25
Mason City, Iowa	.50	.50	.85	1.25	1.25	1.25
Milwaukee, Wis.	.....	.86	.86	.96	.96	.96
Minneapolis, Minn.	.35	.35	1.35	1.35	1.35	1.25
Oxford, Mich.	.25– .35	.20– .30	.30– .40	.55– .75	.55– .75	.60– .75
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.00	1.00	1.00
SOUTHERN:						
Brewster, Fla. (d)	.40	.....	.....	.....	.....	.....
Charleston, W. Va.	.70	1.25	1.25	.....	.....	.....
Eustis, Fla.	.....	.40– .50	.....	.....	.....	.....
Fort Worth, Tex.	1.00	1.00	1.00	1.25	1.25	1.25
Knoxville, Tenn.	.80	1.00	1.50	1.20	1.20	1.20
Roseland, La.	.20	.20	.70	.70	.50	.....
WESTERN:						
Pheonix, Ariz.	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.80	.60	.....	1.20	.....	1.15
San Gabriel, San Fernando Valleys, Cal. (b)	.80	.80	1.30	1.30	1.30	1.30
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*	1.00*	1.25*

*Cu. yd. ‡Delivered on job by truck. (a) Prices on trucks; on cars, 65c per ton for all sizes. (b) Discount, 20c per ton if paid by 10th of month following delivery. (c) In carload lots. (d) To consumers 50c.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	.....	.....	4.00	.....
Cheshire, Mass.	Sand for soap, 5.75–7.00					5.00	.....
Columbus, Ohio	1.35–1.50	1.25–1.50	2.00	1.25–1.35	.....	3.50–4.50	.....
Dresden, Ohio	1.15–1.50	1.00–1.35	1.25–1.50	1.00–1.25	1.25	.....	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	2.50–3.00	.....
Elco, Ill.	Amorphous silica, 90-99½% thru 325 mesh, 10.00–60.00 per ton						
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Montoursville, Penn.	.....	.....	.....	1.50–1.60	.....	.....	.....
New Lexington, Ohio	2.00	1.50	.....	.....	.....	.....	.....
Ohlton, Ohio	1.60	1.60	.....	1.75	1.60	1.75	.....
Ottawa, Ill.	.....	.....	.....	.....	.....	3.50	.....
Red Wing, Minn. (a)	.....	.....	.....	.....	.....	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	.....
South Vineland, N. J.	Dry white silica sand, per ton, 2.25						

†Fresh water washed, steam dried. *Damp. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Dresden, Ohio	.....	1.00
Eau Claire, Wis.	4.30	1.00
Ohlton, Ohio	1.75	1.60
Red Wing, Minn.	.....	1.00
San Francisco, Calif.	3.50	3.50

Glass Sand

(Silica sand is quoted washed, dried and screened)

Cheshire, Mass. (in carload lots)	5.00
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Ottawa, Ill.	1.50
Red Wing, Minn.	1.50
South Vineland, N. J.	1.75
San Francisco, Calif.	4.00–5.00

Bank Run Sand and Gravel

Algonquin, Ill.¶ (½-in. and less)	.30
Buffalo, N. Y.—Sand, 1/10-in. down, 1.00; ¼-in. down, .85; gravel, all sizes	.75
Burnside, Conn. (sand, ¼-in. and less)	.75*
Fort Worth, Tex.¶ (2-in. and less)	.70
Gainesville, Tex.¶ (1-in. and less)	.55
Grand Rapids, Mich.¶ (1-in. and less)	.50
Hersey, Mich.¶ (1-in. and less)	.50
Kalamazoo, Mich.¶ (1½-in. and less)	.35
Mankato, Minn.†	.70
Winona, Minn.—Sand, any size	.60
York, Penn.—Sand, 1/10-in. down, 1.10; ¼-in. and less	1.00

*Cu. yd. †Fine sand. 1/10-in. down. ¶Gravel.

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	F.o.b. city named Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.92½	3.70	.....
Atlanta, Ga.	.....	2.19*	3.49¶
Baltimore, Md.	.....	†2.23–2.26*	3.56¶
Birmingham, Ala.	.....	1.85*	3.15¶
Boston, Mass.	.47	†1.85–1.88*	3.27¶
Buffalo, N. Y.	.51¼	†2.02–2.05*	3.25¶
Cedar Rapids, Ia.	.....	2.23*	.....
Charleston, S. C.	.....	1.85†	3.26¶
Cheyenne, Wyo.	.71½	2.86	.....
Chicago, Ill.	.....	1.95*	3.25¶
Cincinnati, Ohio	.....	2.14*	3.44¶
Cleveland, Ohio	.....	2.04*	3.34¶
Columbus, Ohio	.....	2.17*	3.47¶
Dallas, Texas	.....	1.90*	3.49¶
Davenport, Iowa	.....	2.14*	.....
Dayton, Ohio	.....	2.14*	3.44¶
Denver, Colo.	.76¼	3.05	.....
Des Moines, Iowa	.48½	2.29*	.....
Detroit, Mich.	.....	1.95*	3.25¶
Duluth, Minn.	.....	2.04*	.....
Houston, Texas	.....	2.00*	3.73¶
Indianapolis, Ind.	.54¾	1.99*	3.29¶
Jackson Miss.	.....	2.29*	3.59¶
Jacksonville, Fla.	.....	2.16†	3.46¶
Jersey City, N. J.	.....	†2.10–2.13*	3.43¶
Kansas City, Mo.	.50½	2.02*	3.32¶
Los Angeles, Calif.	.57½	2.30	.....
Louisville, Ky.	.55½	2.12*	3.42¶
Memphis, Tenn.	.....	2.29*	3.59¶
Milwaukee, Wis.	.....	2.10*	3.40¶
Minneapolis, Minn.	.....	2.27*	.....
Montreal, Que.	.....	1.60‖	.....
New Orleans, La.	.....	1.92†	3.22¶
New York, N. Y.	.50¾	†2.00–2.03*	3.33¶
Norfolk, Va.	.....	1.97*	3.27¶
Oklahoma City, Okla.	.61½	2.46*	3.76¶
Omaha, Neb.	.59	2.36*	3.66¶
Peoria, Ill.	.....	2.12*	.....
Pittsburgh, Penn.	.....	†1.92–1.95*	3.25¶
Philadelphia, Penn.	.....	†2.12–2.15*	3.45¶
Portland, Ore.	.....	2.50‡	.....
Reno, Nev.	.....	2.96‡	.....
Richmond, Va.	.....	†2.29–2.32*	3.62¶
San Francisco, Calif.	.....	2.24†	.....
Savannah, Ga.	.....	1.85†	.....
St. Louis, Mo.	.48¾	1.95*	3.25¶
St. Paul, Minn.	.....	2.27*	.....
Seattle, Wash.	.....	1.50–1.75	2.40c
Tampa, Fla.	.....	2.00†	.....
Toledo, Ohio	.....	*2.10–2.20†	3.50¶
Topeka, Kan.	.55¼	2.21*	3.51¶
Tulsa, Okla.	.58¼	2.33*	3.63¶
Wheeling, W. Va.	.....	†1.99–2.02*	3.32¶
Winston-Salem, N.C.	.....	2.44*	3.74¶

Mill prices f.o.b. in carload lots, without bags, to contractors.

Albany, N. Y.	2.15	.....
Bellingham, Wash.	2.25	.....
Bonner Springs, Kan.	1.85	3.15¶
Buffington, Ind.	1.70	.....
Concrete, Wash.	2.65	.....
Hannibal, Mo.	1.80	.....
Hudson, N. Y.	1.85	3.30¶
Independence, Kan.	1.85	.....
Leeds, Ala.	1.70	.....
Limedale, Ind.	1.70	.....
Lime & Oswego, Ore.	2.50	.....
Nazareth, Penn.	2.15	.....
Northampton, Penn.	1.75	.....
Richard City, Tenn.	2.05	.....
Steelton, Minn.	1.85	.....
Toledo, Ohio	2.20	.....
Universal, Penn.	1.70	.....
Waco, Tex.	1.85	.....

NOTE: Unless otherwise noted, prices quoted are net prices, without charge for bags. Add 40c per bbl. for bags. *Includes dealer and cash discounts. †Includes 10c cash discount. ‡Subject to 2% cash discount. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c discount 15 days. ‖Includes sales tax. (c) Quick-hardening "Velo," packed in paper bags.

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.25	1.25	1.25	1.25	1.25	1.25
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Farmington, Conn. (a)	1.00	1.30	1.30	1.00	1.00	.....
Ft. Spring, W. Va.	.35	1.35	1.35	1.25	1.15	1.00
Frederick, Md.	.50–1.00	1.50	1.15–1.50	1.15–1.50	1.05–1.25	1.05–1.25
Oriskany Falls, N. Y.	.85–1.00	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35
Prospect Junction, N. Y.	.50– .80	.....	1.00–1.15	1.00–1.10	1.00–1.10	.....
Rochester, N. Y.—Dolomite	1.50	.....	.....	.....	.....	.....
Hillsville, Penn.	.85	1.35	1.35	1.35	1.35	1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75	.....	1.75	.....	.....	.....
Afton, Mich.	.25	.25	.25	.....	.65	1.50
Cypress, Ill.	1.25	.90	.90	.90	.85	.85
Dubuque, Iowa	.....	.....	1.10	1.10	1.10	.....
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05–1.70	1.05–1.70	.....
Greencastle, Ind.	1.25	1.00	.90	.90	.90	.90
Lannon, Wis.	.80	.80	.80	.80	.80	.80
Sheboygan, Wis.	1.20	1.20	1.10	1.10	.....	.....
Stone City, Iowa	.75	.....	1.10	1.00	1.00	1.00h
Toledo, Ohio	1.60	1.70	.....	1.60	.....	1.60
Toronto, Canada	2.25	2.75	2.25	2.25	.....	2.25
Waukesha, Wis.	.....	.90	.90	.90	.90	.....
SOUTHERN:						
Bridgeport, Chico and Knippa, Texas	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10
Cartersville, Ga.	.....	.75	1.15	1.15	1.00	.90
El Paso, Texas	.50– .75	1.25	1.25	1.00	1.00	1.00
Olive Hill, Ky.	.50	1.00	1.00	.90	.90	.90
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	.25	1.45	1.35e	1.25d	1.20
Cape Girardeau, Mo.	1.10	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis Co., Mo.	1.30–1.40	1.30–1.40	1.10–1.40	1.30–1.40	1.30–1.40	1.30–1.40
Stringtown, Okla.	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn.	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Bridgeport, Chico and Knippa, Texas	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Duluth, Minn.	1.00	2.25	1.75	1.65	1.35	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.35–1.40	1.70–2.10	1.90	1.50	1.50	.....
Richmond, Calif.	.75	1.00	1.00	1.00	1.00	.....
Stringtown, Okla.	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Toronto, Canada	.....	5.30	3.70	.....	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	.....	.....	1.60	1.60	1.50	.....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40b
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.50	1.25	1.25	1.15	1.15	.....
Lohrville, Wis.—Granite	1.80	1.60	.....	1.50	1.50	.....
Middlebrook, Mo.—Granite	3.00–3.50	.....	2.00–2.25	2.00–2.25	.....	1.25–3.00
San Gabriel and San Fernando Valleys, Calif. (Granite)	.....	1.30	1.30	1.30	.....	1.30
(Basalt)	.....	.....	.....	.85	.....	.....
Toccoa, Ga.—Granite	.50	.....	1.30	1.25	1.20	1.15

(a) Stone 1-in., 1.10 per net ton. (b) Ballast. (c) 1-in., 1.40. (d) 2-in., 1.30. (h) Rip rap. (n) Ballast, R. R., .90; run of crusher, 1.00. (r) Cu. yd. (t) Rip rap, 1.20–1.40 per ton.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem, Penn.	1.25–1.50	.50– .60	1.00	.60– .70	.70– .80	.70– .90	.90
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Hokendauqua, Penn.	1.50	.60	1.00	.80–1.00	1.00–1.25	1.00–1.25	1.00–1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	.....
Jackson, Ohio	2.05*	.65*	1.80*	1.30*	1.05*	1.30*	.....
Toledo, Ohio	1.50	1.10	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	2.05*	1.05*	1.65*	1.45*	1.45*	1.45*	.....
Ensley and Birmingham, Ala.	2.05	.55	1.25	1.15	.90	.90	.90
Longdale, Va.	2.50	1.25	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05*	.55*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1½-in. to ¼-in., 1.05; ⅝-in. to 10 mesh, 1.25*; ⅝-in. to 0-in., 90c*; ¼-in. to 10 mesh, .80*.

Agricultural Limestone (Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; 0.3% $MgCO_3$, 90% thru 100 mesh 4.75

Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh 1.50

Cartersville, Ga. 2.00

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton 6.00

Gibsonburg, Ohio—Bulk, 2.25; in bags 3.70

Jamesville, N. Y.—Bulk, 3.50; in 80-lb. bags 4.75

Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk 2.50

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton 2.00

Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh 4.25

West Rutland, Vt. — Analysis, 96.5% $CaCO_3$; 1% $MgCO_3$; 90% thru 50 mesh; bags, per ton, 4.25; bulk 2.50

Agricultural Limestone (Crushed)

Bedford, Ind.—Analysis, 98.44% $CaCO_3$; 0.83% $MgCO_3$; 95% thru 10 mesh 1.50

Cartersville, Ga.—50% thru 50 mesh, per ton 1.25

Colton, Calif.—Analysis, 95-97% $CaCO_3$; 1.31% $MgCO_3$, all thru 14 mesh down to powder 3.50

Cypress, Ill. — Analysis, 96% $CaCO_3$; 90% thru 100 mesh, 1.25; 50% thru 100 mesh, 1.25; 90% thru 50 mesh, 1.25; 50% thru 50 mesh, 1.25; 90% thru 4 mesh, 1.25, and 50% thru 4 mesh 1.25

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton 1.00

Dubuque, Ia.—Analysis, 64.20% $CaCO_3$; 32.64% $MgCO_3$; 90% thru 50 mesh 1.10

Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh; bulk, per ton 1.15

Gibsonburg, Ohio—90% thru 10 mesh 1.00–1.50

Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh, sacked 5.00

Lannon, Wis. — Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh 2.00
Screenings (¼-in. to dust) 1.00

Marblehead, Ohio—90% thru 100 mesh 3.00
90% thru 50 mesh 2.00
90% thru 4 mesh 1.00

Marlbrook, Va.—Precipitated lime-marl. Analysis, 96% $CaCO_3$; 1% $MgCO_3$, 90% thru 50 mesh, bulk, 2.25; in burlap bags 3.75

Olive Hill, Ky.—90% thru 4 mesh, per ton 50–1.00

Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, and 45% thru 200 mesh, per ton a5.00

Piqua, Ohio—30%, 50% and 99% thru 100 mesh 1.00–4.00

Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh 1.15–1.70

Stone City, Ia.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75

West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk 3.50
100-lb. paper bags, 4.75; 100-lb., cloth 5.25

Waukesha, Wis.—90% thru 100 mesh, 4.00; 50% thru 100 mesh 2.10

*Less 25c cash 15 days. (a) Less 50c comm.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton 6.00

Joliet, Ill.—Analysis, 48% $CaCO_3$; 42% $MgCO_3$; 90% thru 200 mesh (bags extra) 3.50

Piqua, Ohio—99% thru 100 mesh, bulk, 3.25; in 80-lb. or 100-lb. bags 4.25

Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk 2.25–3.50

Waukesha, Wis.—90% thru 100 mesh, bulk 4.00

Lime Products

(Carload prices per ton f.o.b. shipping point unless otherwise noted)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Bulk	Ground burnt lime, Bags	Lump lime In bulk	Lump lime In bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	11.40	.....	.....	17.50	.....	20.65
Buffalo, N. Y.	.....	.....	.....	11.00	.....	.....	.....	.....
Cedar Hollow, Devault, Mill Lane, Knickerbocker, Rambo and Swedeland, Penn.	.....	9.50b	9.50b	9.50b	8.00f	9.50d	8.50	.....
Frederick, Md.	.....	8.50	8.50	8.50	.....	8.50	6.50	13.50
Lime Ridge, Penn.	.....	.....	8.00	.....	6.00	7.50[1]	4.50	.....
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	10.85	6.50	.....
Gibsonburg and Cold Springs, Ohio	7.75	6.00	6.00	.....	6.00	8.00	6.00	.....
Huntington, Ind.	.....	6.00	.....	.....	6.00	.....	.....	.....
Marblehead, Ohio	.....	6.00	6.00	11.00	.....	.....	6.00	.....
Milltown, Ind.	.....	9.00	8.25	9.50	7.50	.....	7.00	.....
Scioto, Ohio	7.75	6.00	6.00	7.00	.....	.....	6.00	15.00
Sheboygan, Wis.	.....	10.50	10.50	10.50	.....	.....	9.50	20.00e
White Rock, Ohio	7.75	.....	6.00	.....	6.00	8.00	6.00	.....
Woodville, Ohio	7.75	6.00	6.00	9.00	6.00	8.00	6.00	15.00c
SOUTHERN:								
Keystone, Ala.	17.00	7.00	.....	7.00– 8.00	5.00g	11.55	5.00a	12.65
Knoxville, Tenn.	.....	.....	.....	.....	5.50	11.55	5.00	12.65
Ocala, Fla.	.....	10.00	.....	.....	.....	.....	.....	9.50
Pine Hill, Ky.	.....	9.00	8.00	7.00– 9.00	.....	.....	6.00	12.50
WESTERN:								
Little Rock, Ark.	.....	14.30	.....	14.30	.....	.....	11.90	.....
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
Los Angeles, Calif.	15.50	15.50	.....	.....	.....	.....	13.50	18.00
San Francisco, Calif.†	20.00	20.00	12.00	20.00	.....	.....	.....	.....
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[5]	.....	11.00[4]	.....

[1]In 100-lb. bags. [4]To 14.50. [5]Also 13.00. *Price to dealers. †Wood-burnt lime: finishing hydrate, 20.00 per ton; pulv. lime, 2.00 per iron drum. Oil-burnt pulv. lime, 13.00–14.50 per ton. (a) To 7.00. (b) In 50-lb. paper. (c) In wood; in steel, 16.00. (d) In 80-lb. paper bags. (e) In steel. (f) For chemical purposes. (g) To 7.00.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 300 mesh, 7.00 per ton in paper bags

Slate Granules

Esmont, Va.—Blue, 7.50 per ton.

Granville, N. Y.—Red, green and black, 7.50 per ton.

Pen Argyl, Penn.—Blue-black, 6.50 per ton in bulk, plus 10c per bag.

Roofing Slate

City or shipping point	Prices per square—Standard thickness 3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Bangor, Penn.—						
Gen. Bangor No. 1 clear	10.00–14.00	20.00	25.00	29.00	40.00	50.00
Gen. Bangor No. 1 ribbon	9.00–10.25	16.00	20.00	25.00	35.00	46.00
No. 1 Albion	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Gen. Bangor No. 2 ribbon	6.75– 7.25	.....	.....	.....	.....	.....
Granville, N. Y.—						
Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green & gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple & unfading gr'n	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Pen Argyl, Penn.						
Graduated slate	.....	16.00	23.00	27.00	37.00	46.00
No. 1 clear (smooth text)	7.25–10.50; Albion-Bangor medium, 8.00–9.00; No. 1 ribbon, 8.00–8.50					

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc, per ton 5.00
- Ground talc (20-50 mesh), bags 6.50
- Ground talc (150-200 mesh), bags 9.00
- Pencils and steel crayons, gross 1.50– 2.00

Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¾% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh 7.50– 8.00
1,00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of burlap bags. Terms 1%, 10 days.

Clifton, Va.:
- Ground talc (150-200 mesh), in bags 10.00

Emeryville, N. Y.:
- Ground talc (200 mesh), bags 13.75
- Ground talc (325 mesh), bags 14.75

Hailesboro, N. Y.:
- Ground talc (300-350 mesh), in 200-lb. bags 15.00–20.00

Henry, Va.:
- Crude (mine run), bulk 3.00– 4.50
- Ground talc (150-200 mesh), in bags .. 6.25– 8.25

Joliet, Ill.:
- Ground talc (200 mesh), in bags:
  - California talc 30.00
  - Southern talc 20.00
  - Illinois talc 10.00

Los Angeles, Calif.:
- Ground talc (150-200 mesh), in bags .. 15.00–25.00

Natural Bridge, N. Y.:
- Ground talc (325 mesh), bags 10.00–15.00

Rock Phosphate

Prices given are per ton (2240 lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 76-78% 6.75

Ground Rock
(2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65-72% 3.50– 4.00
Mt. Pleasant, Tenn.—B.P.L. 74.4%, without bags 11.80
In paper bags, 13.80; in cotton bags .. 15.30
Mt. Pleasant, Tenn.—B.P.L. 72% 5.00– 5.50

Florida Phosphate

(Raw Land Pebble)

Mulberry, Fla.—Gross ton, f.o.b. mines
- 68/66% B.P.L. 3.15
- 70% minimum B.P.L. 3.75
- 72% minimum B.P.L. 4.25
- 75/74% B.P.L. 5.25
- 77/76% B.P.L. 6.25

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Rumney Depot, Bristol and Cardigan, N. H.—Per ton:
- Punch mica, per ton 150.00–240.00
- Mine scrap 22.50
- Mine run 325.00
- Clean shop, scrap 25.00
- Roofing mica 37.50
- Trimmed mica, per ton, 20 mesh, 37.50; 40 mesh, 40.00; 60 mesh, 40.00; 100 mesh, 45.00; 200 mesh 60.00

Spruce Pine, N. C.—Mine scrap, per ton 18.00– 20.00

Trenton, N. J.—Mine scrap, per ton, f.o.b. mines 18.00

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

City or shipping point	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	Plaster Board— ½x32x 36". Per M Sq. Ft.	Plaster Board— ⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 6 in. long, 17c per ft., 23.00 per ton.													
Grand Rapids, Mich.	.....	.....	.....	9.00	9.00	9.00	.....	.....	.....	.....	15.00	15.00	27.00
Los Angeles, Calif.	.....	7.50	7.50	10.00	12.20	.....	13.20	.....	.....	.....	.....	.....	.....
Medicine Lodge, Kan.	1.45	.....	.....	.....	.....	.....	11.50d	.....	16.00d	.....	.....	.....	.....
San Francisco, Calif.	.....	10.20d	.....	.....	12.90	.....	13.90	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ¾x48-in. by 5 and 10 ft. long. (g) ⅜x48-in. by 3 to 4 ft. long. (y) Jute sacks, 18.00; paper sacks, 16.00.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream and coral pink	¶12.50–‖14.50	¶12.50–‖14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, per ton in bags		12.00
Crown Point, N. Y.—Mica Spar		¶9.00–‖12.00
Davenport, Iowa — White limestone, in bags, ton	‖6.00	‖6.00
Middlebrook, Mo.—Red		20.00–25.00
Middlebury, Vt. — Middlebury white		¶9.00–‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		c5.50
Phillipsburg, N. J.—Royal green granite, in bags, per ton	15.00–18.00	
Stockton, Calif.—"Nat-rock" roofing grits		12.00–20.00
Tuckahoe, N. Y.	7.00	
Warren, N. H. (d)		¶8.00– 8.50

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L. (d) L.C.L., 9.50–15.00 per ton in 100-lb. bags.

Granular Glasspar

(Chemically Controlled)

Spruce Pine, N. C.—Color, white; analysis, K_2O, 7.20%; Na_2O, 3.70%; SiO_2, 70%; Fe_2O_3, 0.05%; Al_2O_3, 17.50%; per ton, in bulk 10.50

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 2.00 per ton, paper 1.20 per ton); 99% thru 140 mesh, 16.00; 99% thru 200 mesh 18.00

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 5.50%; Na_2O, 5.50%; SiO_2, 68.80%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk 18.00

Potash Feldspar

Keystone, S. D.—Color, white; analysis, K_2O, 12.50%; NaO, 2.25%; SiO_2, 64%; Fe_2O_3, 0.03%; Al_2O_3, 20%, pulverized, 99% thru 200 mesh; in bags, 16.00; bulk 15.00
Crude, in bags, 7.50; bulk 6.50

East Liverpool, Ohio — Color, white; analysis, K_2O, 11.00%; Na_2O, 2.25%; SiO_2, 68.00%; Fe_2O_3, .08%; Al_2O_3, 17.95%, pulverized, 99% thru 200 mesh, in bags, 22.00; in bulk 20.00

Erwin, Tenn.—White; analysis, K_2O, 10.50%; Na_2O, 2.75%; SiO_2, 67.75%; Fe_2O_3, .08%; Al_2O_3, 18.00%, pulverized, 98% thru 200 mesh, in bags, 16.00; bulk 15.00
Crude, in bags, 7.50; bulk 6.50

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.30%; Na_2O, 2%; SiO_2, 67%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk 18.00

West Paris, Me.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.20%; Na_2O, 3.20%; SiO_2, 65.70%; Fe_2O_3, 0.09%; Al_2O_3, 19.20%; per ton, in bulk 19.00

Rochester, N. Y.—Color, white; analysis, K_2O, 12.68%; Na_2O, 2.99%; SiO_2, 64.37%; Fe_2O_3, 0.06%; Al_2O_3, 19.51%; pulverized 98% thru 200 mesh; in bags, 20.00; bulk 18.00

Cement Drain Tile

Graettinger, Iowa — Drain tile, per foot; 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in. 2.00

Grand Rapids, Mich.—Drain tile, per 1000 ft.

4-in.	36.00
6-in.	66.00
8-in.	100.00
10-in.	150.00
12-in.	210.00

Chicken Grits

Cypress, Ill.—(Agstone)	1.15
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per 100-lb. sack, f.o.b. Chico	1.00
Davenport, Iowa—High calcium carbonate limestone, in bags, L.C.L., per ton	6.00
El Paso, Tex.—(Limestone), per 100-lb. sack	.75
Los Angeles, Calif.—(Gypsum), per ton, including sacks	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Piqua, Ohio—(Pearl grit), No. 1 and No. 2	1.00– 4.00
Port Clinton, Ohio—(Gypsum), per ton	6.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.	¶7.50–‖9.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis. (f.o.b.) Barton)	9.50
Dayton, Ohio	12.50–13.50
Detroit, Mich.	13.00–15.50*
Flint, Mich.	15.50‡
Grand Rapids, Mich.	14.00
Iona, N. J.	10.50–12.00
Jackson, Mich.	13.00
Madison, Wis.	12.50†
Milwaukee, Wis.	12.50*
Minneapolis and St. Paul, Minn.	9.50*
Mishawaka, Ind.	11.00
New Brighton, Minn.	10.00
Pontiac, Mich.	11.50
Saginaw, Mich.	13.50
Sebewaing, Mich. (at yard)	12.50
Syracuse, N. Y.	18.00–20.00
Toronto, Canada	11.00–‡13.00*
Wilkinson, Fla.—White, 10.00; buff	14.00
Winnipeg, Canada	15.00

*Delivered on job. †Less 50c dis. per M 10th of month. ‡5% disc., 10 days. §Delivered in city.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	
Brookville, Penn.: 8x8x16	20.00–23.00*
Camden, N. J.: 8x8x16, each	.18
Chicago, Ill.:	
8x 8x16. Each	.21a
8x12x16. Each	.28a
Columbus, Ohio: 8x8x16	14.00§–16.00‡
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12‡
Lexington, Ky.:	
8x8x16	‡18.00*
8x8x16	†16.00*
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*
Omaha, Neb.:	
8x 4x16, each .06½§; 8x6x16, each	.09§
8x 8x16, each .10§; 8x8x16, each	.12‡
8x12x16, each	.15§
Oak Park, Ill.:	
8x8x16, per 1000	160.00

*Price per 100 at plant.
†Rock or panel face.
‡Face. §Plain. (a) Rock face.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Cicero, Ill.—French, Spanish, Closed End Shingle, and English Shingle, per sq.	9.50–13.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Lexington, Ky.—8x15, per sq.:	
Red	15.00
Green	18.00
Longview, Wash.:	
4x6x12-in., per 1000	55.00
4x8x12-in., per 1000	65.00
New York City, N. Y.:	
Roofing tile, per sq.	10.00–13.00

Cement Building Tile

Oak Park, Ill. (Haydite):	
8x 8x16, per 1000	200.00
8x12x16, per 1000	300.00
Lexington, Ky.:	
5x8x12, per 1000	55.00
4x5x12, per 1000	35.00
Longview, Wash. (Stone Tile):	
4x6x12, per 1000, at plant	54.00
4x8x12, per 1000, at plant	64.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	
Oak Park, Ill., "Haydite"	16.00	
Ensley, Ala., "Slagtex"	8.00–10.00	
Longview, Wash.	16.50	22.00– 40.00
Milwaukee, Wis.	13.00	20.00– 36.00
Omaha, Neb.	18.00	30.00– 40.00
Prairie du Chien, Wis.	14.00	22.50– 25.00
Rapid City, S. D.	16.00	30.00

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points. Bags extra and returnable for full credit.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00
Joliet, Ill.—All passing 100 mesh. Price per ton, f.o.b. Joliet, including cost of bags	24.00

Stone-Tile Hollow Brick

Prices are net per thousand, f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.	.....	53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.	.....	55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans La.	35.00	45.00	60.00
Norfolk Va.	35.00	50.00	65.00
Passaic, N. J.	40.00	52.50	70.00
Patchogue, N. Y.	.....	60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x 4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% discount.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4-in.	6-in.	8-in.	10-in.	12-in.	15-in.	18-in.	20-in.	22-in.	24-in.	27-in.	30-in.	36-in.	42-in.	48-in.	54-in.	60-in.
Grand Rapids, Mich. (b)																	
Sewer	.....	.12	.18	.27½	.35	.47	.92½	1.11	.....	1.66½	2.47	2.73½	.....	.....	.....	.....	.....
Culvert	.....	.....	.....	.57	.67	.93	1.20	.....	.....	1.80	2.10	2.25	3.35	4.00	5.60	6.90	7.85
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Milwaukee, Wis.	Cast stone window sills, 5 in. x 5½ in., 60c per lineal ft.																
Newark, N. J. (d)	.....	.....	.....	.....	.90	1.15	1.50	.....	.....	1.85	2.35	2.76	3.77	4.93	6.21	7.66	9.28
Unreinforced	.....	.16	.25	.37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk, Neb.	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Tiskilwa, Ill.	.....	.....	.....	.75	.85	.95	1.20	1.60	.....	2.00	.....	2.75	3.40	.....	6.50	.....	10.00
Wahoo, Neb. (c)	.....	.....	.....	.....	.85½	.....	1.14	.....	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31

(a) 24-in. lengths. †21-in. diam. (c) Reinforced, 15.40 per ton, f.o.b. plant. (d) Reinforced, 21-in., 1.69; unreinforced, 21-in., 1.26; 5% cash discount.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

New Market for Portland Cement

Grand Rapids (Mich.) Sand-Lime Brick Manufacturer Opens Two New Markets by Clever Adaptation of His Machinery to Coal Field

By William P. Coleman

MOST EVERYONE, it seems, has some plan to start the wheels of industry turning again, but in Grand Rapids, Mich., the Grande Brick Co. has quietly gone to work and developed a new market for portland cement at the rate of six carloads a month, besides creating a side line to fill in on a reduced production schedule.

The Grande Brick Co. manufactures sand-lime brick under the Jackson and Church process, and the new side line is the manufacture for coal dealers of fuel brick, a new fuel composed of Pocahontas slack using a binder of from two to four bags of portland cement to the ton of slack. Brick are of regular sand-lime size, 8 in. by 2¼ in. by 3¾ in.

A truck-load of the new fuel brick being produced from Pocahontas slack and cement by the Grande Brick Co.

Extensive tests demonstrate that this new fuel brick burns as well or better than prepared Pocahontos coal, depending on the nature of the fire. The brick has been used in the heating plant of the Grande Brick Co. office, in the heating plants of various coal yard offices and in the homes of many coal dealers and their employes. Fuel brick have been burned in hot air, hot water and steam heating plants, in coal ranges and heaters and in fireplaces. It is unusually effective in fireplaces.

The fuel brick is selling, not merely priced, at from $11 to $11.50 a ton, which is considerably higher than the $4 to $4.50 which Pocahontas slack sells for when it can be sold! Slack has been going begging, due to business conditions. Inactivity in the steel mills and other large industrials caused a glutting of the market on slack and the mine properties have been overrun with the fuel.

Until it could be moved, the mine operators were powerless to prepare coal sizes, therefore slack was shipped to dealers who ordered Pocahontas coal. Idle industries in Grand Rapids had no use for the slack, and householders wouldn't accept it as a gift. Consequently retail stocks in the local coal yards were tremendous, with no immediate possibility of getting rid of it.

C. W. Rankin, commercial coal salesman for the A. Himes Coal Co., Grand Rapids, had formerly sold coal to the Grande Brick Co., and he recalled something of the brick making process of mixing lime and sand in proper proportions, moistening with water, and molding under heavy pressure into brick form. He wondered whether some similar process might be worked out with coal slack. He took his problem to T. O. King and G. H. Nichols, manager and superintendent, respectively, of the Grande Brick Co.

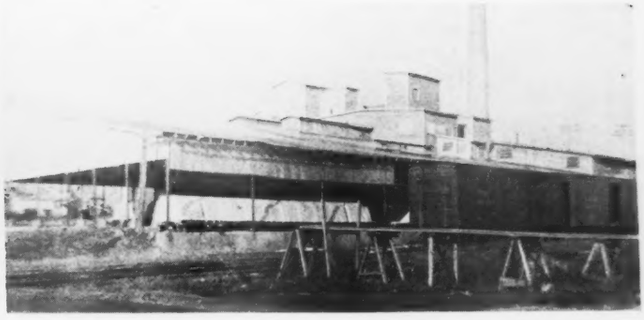
Messrs. King and Nichols immediately worked out a process, substituting portland cement for lime as a binder. The first batch was mixed, using three bags of cement for every ton of coal slack, just enough water was added so that the mixture would pack in the hand and pass through the brick press or molding machine. It molded perfectly. The bricks were loaded on to small factory cars. Some of the cars were run into the hardening kettles or ovens to be cooked under 60-lb. steam pressure and others were left outside to harden and cool in the air. The cooked brick, when removed from the kettles, were found to be crumbly, but the brick left to air harden were very solid and failed to break even when dropped on a cement floor.

Then began a thorough series of burning

Some 60 tons of the new fuel brick stacked for drying out

These four factory cars carry 5,280 brick or five tons of fuel

Seventeen tons of sand-lime brick in front of Grande Brick Co. office



View of sand-lime brick on factory cars under storage shed

tests, as previously mentioned, and the fuel brick came through with flying colors. Coal dealers were notified by telephone and personal calls concerning the success of the fuel brick and were invited to turn their unsaleable slack into fuel brick. After a number of conferences, some of the coal dealers agreed. Within two weeks nearly 1000 tons of Pocahontas slack and three carloads of portland cement were manufactured into fuel brick.

The Cost to the Coal Dealer

The coal dealer's cost of thus transforming his coal slack varied according to the distance of his office from the brick plant and the preference of the individual dealer regarding the quantity of cement to be used as a binder. The majority favor three bags of cement to the ton of coal slack, and the average cost figures out as follows:

Load coal slack and haul to brick plant.....	$0.65
Brick plant handling charges..	1.25
Cement, 3 bags, at carload prices	1.60
Load and haul fuel brick to coal yard.....	0.75
	$4.25

These costs are not unreasonable, even though they exceed by 100% the regular retail price of slack, for the coal dealers are thus enabled to move a fuel that just does not sell otherwise at regular prepared size Pocahontas prices.

Coal dealers are merchandising the fuel brick under one of two plans. One is to include 200 lb. of fuel brick with 1800 lb. of prepared coal on every Pocahontas 1-ton order, and to include the same quantity of fuel brick with 1800 lb. of any other type of fuel if the customer is known to have a fireplace.

The other plan is the offer of a trial of 10 brick for 25 cents. Both plans have resulted in reorders, in ½-ton and 1-ton lots, of the fuel brick which has numerous advantages, namely, it does not deteriorate as does ordinary coal and it is unusually clean. It may be tumbled down a coal chute into the basement with negligible breakage and it is comparatively smokeless, with very little ash added by the cement binder.

One of the sand-lime brick making machines being used for molding the new fuel brick. In the photo it is turning out the sand-lime product

Thousands of tons of slack still remain in the 65 Grand Rapids coal yards, but it is very likely that all of it will be molded into fuel brick in the near future. Dealers who have already stocked the fuel brick are almost unanimous in declaring that additional fuel brick will be made when present stocks are depleted.

Contemplate Enlarging Plant

The outcome of this experiment will be profitable for all concerned, for there is not the slightest doubt that fuel brick, since first manufactured in October of this year, has made a place for itself. The Grande Brick Co. is seriously con-

The Grande Brick Co., Grand Rapids, Mich., viewed from the top of the sand hill. In the right foreground is the sand conveyor which, in the process of making fuel brick, carries the coal slack. The cement is dumped into the lime elevator through the open door on the ground level under the sand conveyor

sidering the construction of an additional complete material handling and brick making unit to accommodate the production of fuel brick, and the building of a great storage shed with a capacity of perhaps several million fuel brick.

The plan then is to have all slack routed directly from the mines to the brick yard instead of to the individual coal yards, thus cutting handling costs to the bone. If this plan goes through, an inventory system will be set up in the brick plant office covering slack and fuel brick so that each dealer will receive proper credit. With this plan in operation, when customers order fuel brick, the coal truck would be sent "deadhead" to the brick yard to pick up the load. Coal dealers are in favor of the plan, as it will save them handling charges and also storage space.

The Grande Brick Co., with present equipment of Jackson and Church material handling equipment and brick making presses, can produce 120 tons of fuel brick in a 10½-hr. day, or 240 tons working two shifts. It is necessary to suspend sand-lime brick production while working on the fuel brick, for the pulverized slack floats through the air and soils the sand-lime brick.

The process used for making fuel brick follows closely that used in making sand-lime brick. Coal slack is dumped into the sand conveyor near the sand pit and carried up a 156-ft. incline conveyor, discharged into a second conveyor and emptied into a sand hopper. Cement is dumped into the lime receiving bin, carried up a bucket elevator and carried by various conveyors to a 25-ton storage hopper ordinarily used for lime. Slack and cement are measured and mixed and the mixture is finally discharged into a feeding hopper above the brick press and then fed as required into the brick molding machines, to be compressed into brick form under 10-ton pressure.

The fuel brick offers a profitable fill-in to the brick plant during the slack building season. Under the plan followed at the Grande Brick Co. plant, coal drivers dump their slack into the conveyor and also remove the fuel brick after they have hardened, which does not necessitate the use of additional brick yard employes.

New Concrete Products Plant for North Carolina Town

A PARTNERSHIP has been formed by Joe Kirkman, of Mt. Airy, and A. O. Bray, of North Wilkesboro, N. C., to be known as the Concrete Products plant. The purpose of this plant will be to begin with the manufacture of concrete tile of various sizes and for general use in road building where small bridges are needed, for well curbing and for various uses in town and on the farm. Later other concrete products will be added.

Mr. Kirkman is a well known expert in concrete products in and around Mt. Airy, where he has done this kind of work for the past 15 years. He was employed by the Mt. Airy Granite Works in a responsible position for several years before engaging in the business of manufacturing concrete products. His work is well known by the state highway commission and many tests of his products have proved their quality.

Mr. Bray is a native of Wilkes county and is well known throughout this section of the state. He has started several new enterprises here. About a quarter of a century ago he put the local flour mill on the map and created the well-known brands of Daniel Boone and Becky Boone flour. Twenty-one years ago he opened the first retail coal yard in this city, which is still going strong. Ten years ago he started Elkin's first dairy, which he is now operating. About seven years ago he, in partnership with J. A. Jones, put in operation the Wilkes Laundry, which has served the community well and is a credit to him and to Mr. Jones, who recently became sole owner.

Mr. Kirkman will have charge of the operation of the concrete plant, which will be located between the Wilkes Milling Co. and the fair grounds. Mr. Bray will be sales manager for the business, assisted by Mr. Kirkman, and the office for the present will be located in the office of the Wilkes Milling Co.—*North Wilkesboro* (N. C.) *Journal.*

Frederick Eugene Farnsworth

FREDERICK EUGENE FARNSWORTH, general secretary of the American Bankers' Association from 1907 to 1919, died recently at his home in Park, on Long Island. He was 78 years old.

Mr. Farnsworth was born in Detroit and became cashier of the Union National Bank of Detroit in 1898. In 1903 he was made general manager of the Great Northern Portland Cement Co., of Marlborough, Mich. He was city assessor of Detroit from 1891-97 and was a colonel on the staff of Governor Luce, of Michigan, from 1887 to 1891. From 1887 to 1897 he was secretary of the Michigan Republican Club.

Iowa Cement Products Plant Changes Hands

A. P. NELSON of the Spencer Cement Products Co., Spencer, Iowa, has bought several carloads of the machinery of the Cement Products Co. of Mason City, Iowa, which shut down four years ago.

The Mason City company was one of those in which Jack Hammond and J. J. Radford, now in California, were interested, the other three being at Spencer, Sac City and Lanesboro.

At one time Mr. Nelson is said to have had the largest drain tile works in the world. Tile of all sizes up to where half a dozen constituted a truck load were made here in the days when farms were being tiled in all the midwestern states. Mr. Nelson still makes tile but has added cement blocks of various kinds, and his output will be doubled with the machinery brought from the Mason City plant. When the tiling and building boom collapsed Mr. Nelson with the families of his workmen moved to Chicago, where they did cement work of all kinds on contract, returning home about a year ago.

Work continues at the tile plant practically the year around.—*Missouri Valley* (Iowa) *Times.*

Paris Transit Mixed Concrete Manufacturers Fix Their Convention Date

THE NATIONAL ASSOCIATION of Paris Transit Mixed Concrete Manufacturers will hold its annual convention in St. Louis, Mo., January 9-10-11-12, which is Friday, Saturday, Sunday and Monday preceding the Annual Road Show in the same city.

The association is composed of more than 50 operators in the United States and Canada, and is independent of the National Ready Mixed Concrete Association, which will also hold its annual convention in St. Louis, but at a later date—January 26.

The National Association of Paris Transit Mixed Concrete Manufacturers has executive offices at East Water and East Salmon streets, Portland, Ore. E. A. Landis is executive secretary; Porter W. Yett, Portland operator, is president.

Sand-Lime Brick Production and Shipments in October

THE following data are compiled from reports received direct from 20 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is one less than those furnishing statistics for the September estimate, published in the October 11 issue. The statistics below may be regarded as representative of the entire industry in the United States and Canada.

The number of plants reporting in October is one less than those furnishing statistics for September, and it is estimated that production has increased somewhat, as have shipments by rail and truck. Stocks on hand show a decrease, while unfilled orders, it is estimated, remain about the same.

The following are average prices quoted for sand-lime brick in October:

Average Prices for October

Shipping point	Plant price	Delivered
Atlantic City, N. J.	$11.00	$15.00
Dayton Ohio	12.50	15.50
Detroit, Mich.	12.50	15.50
Detroit, Mich.	13.00	14.50
Detroit, Mich.	12.00	14.00
Grand Rapids, Mich.	14.00	.....
Iona, N. J.	10.50@12.00	14.50
Jackson, Mich.	13.00	.....
Milwaukee, Wis.	9.50	12.50
Minneapolis, Minn.	10.00	.....
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	13.00	.....
Saginaw, Mich.	12.00	.....
Sioux Falls, S. Dak.	12.00	.....
Syracuse, N. Y.	18.00	20.00
Toronto, Can.	11.00	13.00

The following statistics are compiled from data received direct from 20 producers of sand-lime brick in the United States and Canada:

Statistics for September and October

	†September	*October
Production	7,877,367	7,924,915
Shipments rail)	3,278,470	3,437,000
Shipments (truck)	6,552,502	6,168,967
Stocks	14,150,947	12,260,149
Unfilled orders	8,957,000	7,567,000

†Twenty-one plants reporting. Statistics have been included from one additional plant not reporting in time for the figures published in the October 11 issue. Incomplete, three plants not reporting, one not reporting stocks on hand and six not reporting unfilled orders.

*Twenty plants reporting. Incomplete, one plant not reporting production and seven not reporting unfilled orders.

Cement Man Out for Mayor of Columbus

Floyd F. Green

FLOYD F. GREEN, at present a city councilman and manager of the local district for the Southwestern Portland Cement Co., Columbus, Ohio, has announced his candidacy for mayor of Columbus, in the mayoralty contest to be held in November of 1931.

Activity Beginning in Virginia Slate Field

THREE of four large slate manufacturing companies of the Buckingham slate field have just resumed operations after having been closed since July 1. The Blue Ridge Slate Corp., manufacturers of slate material used in composition roofing, which has been operating part time all summer, has now begun operations upon a larger scale, and in addition to grinding is manufacturing roofing slate. The companies now operating, in addition to the Blue Ridge Corp., are the Williams Slate Co., the Arvonia-Buckingham Slate Co. and the LeSueur-Richmond Slate Corp.

Altogether, many hundreds of men are employed, and there is little unemployment in this section.

The Buckingham slate region is the foremost of its kind in the South, and is one of the most noted in the United States, the slate having been quarried here for considerably more than a hundred years. The quality of the slate is unsurpassed, and has taken gold medals at many international expositions. Within recent months, after severe competition, Buckingham slate won over a number of slate fields in furnishing roofing materials for a group of buildings at Harvard University. A mansion recently built on the Maine coast for Edsel Ford was covered with rustic Buckingham slate. This material has a wide sale throughout the South and the East.—*Lynchburg* (Va.) *News.*

Attractive letterhead used by California gravel company

A Letterhead That Sells

THE attractive letterhead shown in the accompanying illustration is being used by the Stony Creek Gravel Co., Orland, Calif.

As will be noted, it carries a picture of the operation itself outlined by a border of bronze blue on which the company's name and slogans in white lettering stand out clearly and impressively.

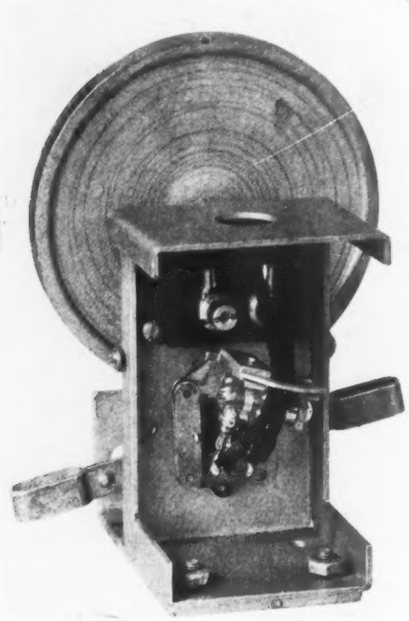
We have no doubt but that a letterhead of this character plays a considerable part in making sales.

New Machinery and Equipment

New Float Switch Has Mercury Tube Contacts

USE OF a mercury switch as part of a new float switch (CR-2931-U), announced by the General Electric Co., Schenectady, N. Y., it is claimed, makes the device suitable for use in atmospheres where open type, mechanical contacts might be subject to corrosion, or where, for other reasons, it is desirable to totally enclose the contacts. In addition the mercury type contact, it is said, makes the device suitable for heavy duty, and thus it can be used for throwing motors directly on the line up to the following capacities:

Circuit	Motor horsepower	Voltage	Amperes capacity switch
Alternating current, single-phase	½	110	10
		220	5
		550	2½
Alternating current	¼	110	10
		220	5
		550	2½
Direct current	¼	80	15
		125	10
		250	5



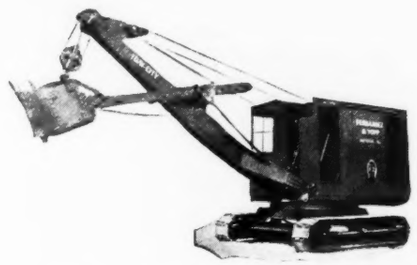
New float switch employing mercury switch

Float switches are used where control is to be actuated by the level of a liquid in a tank or other reservoir. For example, where it is desired to replenish a reservoir when the water falls to a predetermined minimum, the switch can actuate control devices which will start a motor-operated pump at the proper time.

The mercury switch used in this new float switch is known as a Kon-nec-tor and it consists of a hard glass envelope containing a quantity of mercury and having two inleading wires. The envelope is so constructed that when the switch is in the closed position the mercury forms a continuous stream from one inleading wire to the other. In the open position the mercury breaks into two distinct pools so that one of the inleading wires is immersed in each, with an open space between the pools. Thus circuits are made and broken in the mercury and never between the mercury and either of the inleading wires. The glass envelope is filled with an inert gas which prevents oxidation and the establishment of an arc upon opening a circuit under load.

New Small Shovel

THE Bay City Shovels, Inc., Bay City, Mich., announces an addition to its line of Model K, light, small, convertible, gasoline shovels. The addition is a Model K-2, which is appreciably larger and heavier than its older Model K shovels. The K-2 shovel weighs 18 tons and has a full ½ cu. yd. (struck measure) bucket with manganese-steel front and reversible teeth. The boom is 18 ft., the dipper stick 12½ ft., with the chain type crowd. The shovel is equipped with 16-in. crawler treads. It is convertible into the usual crane, dragline, skimmer and trench hoe.



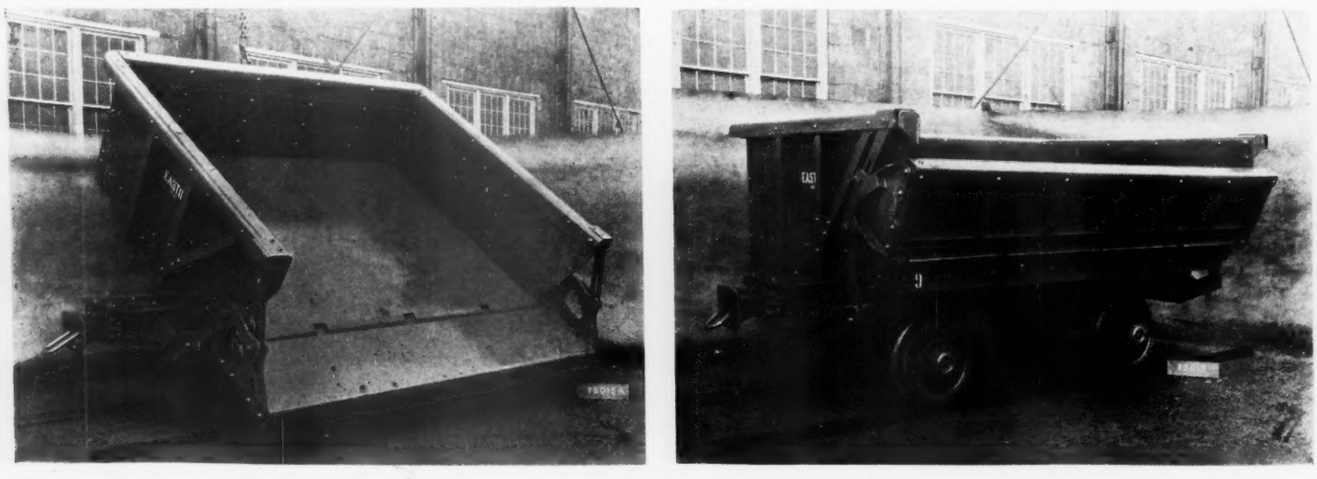
Small convertible gasoline shovel

New Type of Quarry Car

THE ILLUSTRATIONS show a new type of Easton "WonWay" quarry car which is being manufactured by the Easton Car and Construction Co., Easton, Penn.

The car has a capacity of 5 cu. yd., and is arranged for 36-in. gage track, but it may be had in other gages and capacities.

While the WonWay car is not new to the industry, the manufacturers state that the car illustrated is an improvement in many details over the cars previously furnished. These improvements include the design of underframe known as the inside frame type, permitting the Timken roller bearings to be located in the hubs of the wheels and retaining the spring suspension



New quarry car embodies many improved features; note the drop door illustrated at the left

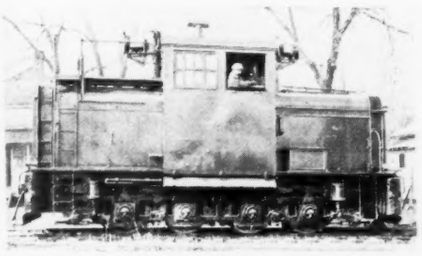
to the underframe.

It is maintained that in actual service it has been found that this car has equal stability with the original outside-frame brass-bearing construction, and that it has a tendency to hold the track far better under all conditions. It is particularly adaptable, it is said, in any operation where the breaking of the stone requires feeding into the crusher to prevent choking or bridging. The manufacturers state that the WonWay car accomplishes this perfectly, as absolute control of the dumping may be had at all times, and the drop-door feature permits it to quickly and cleanly discharge any size stone that can be loaded into it.

The car has been especially designed for steam-shovel loading service and in practice was found to carry an average load of about 8 to 9 tons.

Large Oil-Electric Locomotive

OIL-ELECTRIC locomotives for use in both industrial and railway service are rapidly gaining in favor. The Geo. D. Whitcomb Co., Rochelle, Ill., recently completed two large oil-electric locomotives, 80 to 90 tons in weight, for the Milwaukee railroad and accompanying illustration shows a locomotive of this type which the company recently placed in service for the Chicago, Milwaukee, St. Paul and Pacific railroad.



Large oil-electric locomotive

This is a 600-hp. 80-ton oil-electric switching locomotive of the 0-8-0 rigid wheel base type, 4 ft. 8½ in. gage, powered by a six-cylinder engine. The length from center to center of couplers is 29 ft. 6 in., and the height over all is 15 ft. 2 in. Weight of the total engine is 160,000 lb.

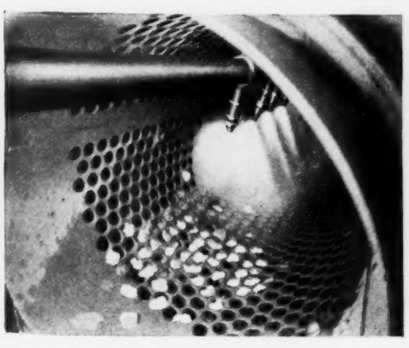


Fig. 2. Revolving screen equipped with gravel washing nozzles

Concrete Machinery Concern Moves Headquarters

THE PORTLAND CONCRETE MACHINES CO., formerly of Chicago, Ill., has moved its headquarters to Cleveland and is now located there at 4519 Hamilton Avenue, N. E.

The company sponsors a complete line of machinery for ready-mixed concrete plants, including elevators, bins, batchers, stationary mixers, truck mixers, and all other incidental equipment, as well as automatic machinery for producing block, tile and other concrete products.

The firm also conducts an engineering and consulting service whereby complete ready-mix and products plants are designed and equipped, and operating schedules and budgets prepared, so that each unit of equipment is consistent with every other unit, and the plant may operate at maximum efficiency and economy.

Design and testing have been in progress in the Cleveland plant of Industrial Brownhoist Corp. for more than a year. A substantial stock of machinery is carried for immediate shipment, and with intensive marketing actively under way, it has been decided to locate executive offices at the manufacturing plant where more effective co-operation can be maintained between sales and manufacturing staffs.

Hydraulic Spray Nozzles of Special Design

A LINE OF gravel washing nozzles, as illustrated by Fig. 1, has recently been developed by the Binks Manufacturing Co., Chicago, Ill.

The nozzles are designed with a stationary internal two-vane helical core, which sets up a tremendous velocity within the nozzle whirl chamber, discharging the water in full mass spray effect throughout the entire cross section of the spray cone which fully penetrates all material under which the nozzles are directed.

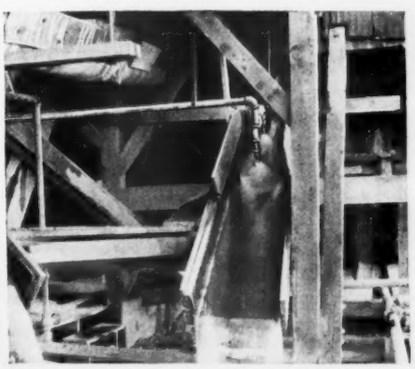


Fig. 3. Vibrating screen employing hydraulic spray nozzles

The manufacturers claim that revolving and vibrating screens when equipped with nozzles of this type not only produce a clean product washed free of overburden, silt, clay balls, and other foreign substances, but that the nozzles have the added advantage of tending to increase the capacity of the screen.

Fig. 2 illustrates a typical installation of nozzles as used in connection with revolving screens, and Fig. 3 shows the same type of nozzle employed in connection with vibrating screens.

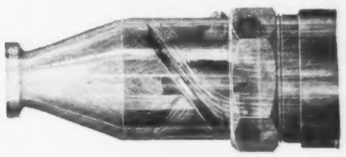
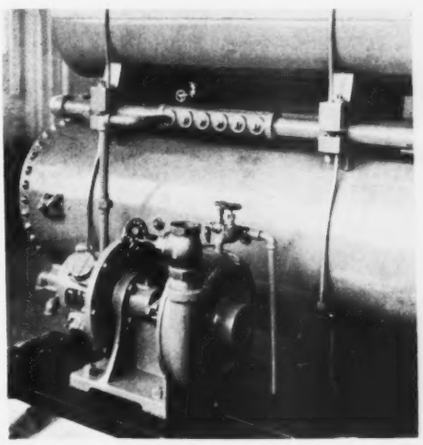


Fig. 1. Showing one of the new gravel washing nozzles

Air-Motor-Driven Pump

A NEW air-motor-driven pump, known as the "ACV," is being marketed by Ingersoll-Rand Co., New York City. The pump is a Cameron single-stage, single-suction, open-impeller, volute type and is driven by a four-cylinder air motor.



Single-stage air-motor-driven pump

It can be mounted on a shelf at the rear of a portable air compressor, and in this position the connecting pipe between the air receiver and the motor will not interfere with the operation of the hose line supplying air to the drills. Ample space is left on the shelf for a tool box, which does not hinder the operation of the pump.

According to the manufacturers, the unit is positive in action, and will prove useful for dewatering trenches and excavations that have become filled overnight. The pump will also be found useful in keeping the workings free from water caused by surface drainage or seepage while the men are at work.

The capacity of the pump, with 60 lb.-air pressure at 1000 r.p.m., is 130 gal. per min. against a 29-ft. head. With 80-lb. air pressure at 1200 r.p.m., the capacity is 125 gal. per min. against a 43-ft. head, the foregoing figures being based on a 20-ft. suction lift.

News of All the Industry

Incorporation

Houston Concrete Pipe Co., Houston, Tex., has increased its capital stock from $20,000 to $30,000.

Northwestern States Portland Cement Co., Mason City, Ia., 225,000 shares of no par value.

Southwestern Gravel Co., Oklahoma City, Okla., $10,000. J. Lee Smith, J. H. Hurst and O. L. Rea.

Electrostone Co., Rushville, Ind. To produce and deal in gypsum, asbestos and byproducts.

Thunder Bay Quarries Co., Wilmington, Del., $500,000.

Roxbury Washed Sand and Gravel Co., Inc., Ledgewood, N. J., 1000 shares common.

Air City Gravel Co., Dayton, Ohio, 200 shares of no par value. E. W. Campbell, Marie J. Campbell and Jacob Iller.

Ristau Concrete Products Co., Bloomington, Ill., $8,000. Albert Ristau, Emil F. Grohne and Henry L. Grohne, 329 S. Glencoe St., Decatur, Ill.

Kasota Stone Quarries, Minneapolis, Minn., $50,000. Wm. A. Penn, Joseph T. Eide and Hubert Piret, all of Minneapolis.

Pueblo Quarries, Inc., Pueblo, Colo., $10,000. J. F. Springfield, Charles E. Sutton and J. R. Greenless.

Columbia Sand and Gravel Co., Columbia, S. C., $10,000. Knox Burger, president; W. S. Gardener, vice-president, and D. W. Robinson, Jr., secretary.

McComb Gravel Co., Houston, Tex., $20,000. W. P. McComb, W. P. Calloway and D. A. Gorman.

Standard Rock Asphalt Co., Nevada, Mo. B. H. Cubbage, Chanute, Kan., and George S. McLaughlin, Deerfield, Mo.

Peerless Sand and Gravel Co., Ltd., 719 Stock Exchange Bldg., Vancouver, B. C., Canada, $100,000.

Profits Island Gravel Co., Inc., New Orleans, La., $200,000. G. V. W. Lymann, Canal Bank Bldg., New Orleans.

Lite-Crete Products Co., Inc., Medford, Mass., $50,000. To produce cement. T. J. Rappoli of Medford, Angelo Benedetti of Haverhill, Mass., and Luigi Santucci of Arlington, Mass.

Co-operative Sandstone Corp., Bloomington, Ind., 3000 shares, par value $50 each. Ellsworth Deckard, 808 S. Washington St., Bloomington; Alger S. Burkhardt and Jack O. Garrett.

Conemaugh Quarries, Inc., Johnstown, Penn., $50,000. President, Harry B. Mainhart; vice-president, Alfred Slater; secretary-treasurer, H. S. Endsley.

M. J. Lotto Construction Co., De Pere, Wis., $20,000 (200 shares of $100 each). M. J. and Frances Lotto and George Reinert, all of Green Bay, Wis.

Quarries

Conestoga Stone and Lime Co., Conostoga, Penn., is reported to have filed voluntary petition of bankruptcy.

Standard Rock Asphalt Co., Scott, Kan., is to develop 100 acres at Nevada, Mo. Dr. N. M. Cubbagem is president.

El Centro, Calif. Directors of the Imperial Irrigation district have authorized the purchase of a rock quarry seven miles west of Calipatria, from S. A. Armstrong. The rock will be used for making cement for construction work.

Williamsport, Penn. It is possible that the old marble quarry in the Mosquito Valley near here will be reopened. Interested parties from Philadelphia inspected the quarry recently, and it is said that they were pleased with the results of the examination. The quarry was operated for a short time many years ago and was then abandoned.

Sand and Gravel

Coleridge, Neb. A gravel pit has been opened on John Brockman's farm north of Coleridge.

Carpinteria, Calif. The gravel pits on the Catlin ranch, which were closed a few years ago, have been reopened by Fred S. Barrick. A crusher and new screens are being installed.

Huntington Gravel and Supply Co., Huntington, W. Va., has been awarded the contract for furnishing 16,000 cu. yd. of gravel to be used on state road No. 34 in Putnam county. The bid was $23,200.

The Service Gravel Co. has purchased the property of the Riverside Gravel Co., Riverside, Calif., and is making extensive improvements in the operation. A tunnel is being erected under B street for the gravel cars.

Owen Dean and Sons have just completed improvements at their gravel pit at American Fork, Utah, including the installation of bins so arranged that wagons or trucks can be driven under and loaded by simply pulling out a slide.

Consumers Co. has purchased the Aetna Sand and Gravel Co.'s plant at Algonquin, Ill. Charles Humphrey, associated with the Aetna company for 27 years as superintendent, continues in that position under the new management.

Pioneer Sand and Gravel Co., Seattle, Wash., is supplying 1000 cars of sand and gravel for the paving of the West Highway near here, which is now under construction. The company has erected a hopper and washing machinery on the Milwaukee line to facilitate service on this contract.

Humboldt Gravel and Tile Co.'s gravel business at Humboldt, Ia., has been taken over by L. S. Cass, president of the Waterloo, Cedar Falls and Northern Railway Co. Mr. Cass owns several gravel pits in Iowa and adjoining states. George McCullough, former owner, has retained the tile and snow fence products business. The plant produces about 60,000 tons of gravel annually.

Ross Island Sand and Gravel Co., Portland, Ore. Residents in the vicinity of the company's plant at East Eighth and Boise streets, are opposing any extension of the plant and have objected to the company's application for a permit for a truck tunnel and belt conveyor, on the grounds that the plant disturbs the quiet of the district.

Northport, L. I. The suit against the Metropolitan Sand and Gravel Co. brought by the village of Asharoken has been ordered to be tried in Riverhead, N. Y., next month. The suit is for a permanent injunction against the company to restrain it from dredging in Northport harbor. The village contends that such dredging and the construction of jetties will cause serious damage to the waterfront at Asharoken and that this dredging is in violation of the zoning ordinance.

Maugus Block, Sand and Gravel Co., Wellesley, Mass., has disposed of over ten acres of its property to the town of Wellesley, to be used by the city for supplying gravel for road building. Mr. Halperin and Mr. Bennett of the Maugus company obtained control of the property about two years ago and began the manufacture of concrete blocks and the sale of gravel. One of the buildings sustained a considerable loss by fire a few months ago and since the fire the business has been more or less at a standstill.

Cement

Lehigh Portland Cement Co., Allentown, Penn., will receive a refund of $83,984 from the internal revenue department for overassessments in 1921 to 1923, inclusive.

The Hy-Test Cement Co., Inc., has leased a suite of offices on the 20th floor of the building at 1616 Walnut St., Phidalephia, Penn., for a Philadelphia district office.

Newaygo Portland Cement Co., Newaygo, Mich., entertained a group of Grand Rapids architects on November 1. The men inspected the plant, were entertained at dinner at the Wayside Inn, and were taken on an inspection tour to the Hardy dam.

Monolith Portland Midwest Co.'s plant at Laramie, Wyo., has been shut down temporarily and will be reopened again in February, according to F. J. Anderson, superintendent. Shipping of cement will continue with 10 men remaining employed.

Cemento Portland Nacional, S. A., which is constructing a plant at Hermosillo, Sonora, Mexico, received the first carload of machinery from the Traylor Engineering and Manufacturing Co. of Allentown, Penn. This is to be followed by 15 more carloads from the same company and engine equipment from the Worthington Pump and Machinery Corp.

Nazareth Cement Co., Nazareth, Penn. The Foremen's Association of the company held its monthly meeting recently, with a good attendance. A feature of the meeting was the showing of a five-reel film showing the manufacture of seamless pipe. J. V. Daneker, quarry superintendent of the company, spoke on the meeting of the quarry section at the National Safety Congress recently held in Pittsburgh. Lawrence Rice, also of the Nazareth organization, spoke on the subject of safety, and Fred Hunt, who acted as toastmaster for the occasion, gave a general resume of the proceedings of the safety congress.

Gypsum

Certain-teed Products Corp., New York City. Operations at the company's mines at Port Clinton, Ohio, are improving and a number of men have been added to the force. It is expected that mining operations will be conducted the greater part of the winter.

Universal Gypsum and Lime Co.'s sales office at Fort Dodge, Ia., will be moved to Minneapolis the latter part of November. W. S. Brown, sales manager for this office, and J. R. O'Neill, assistant sales manager, will move to Minneapolis with this branch.

Cement Products

Nagel Cement Block Co.'s plant at Libertyville, Ill., is being moved from its Cook street location to the property purchased by the company some time ago from Cape and Sons on Second street, just south of the St. Paul tracks. A new building has been erected to house the plant.

Ristau Concrete Products Co., Bloomington, Ill., a newly incorporated cement products firm, is succeeding the Norwalk Burial Vault Co., which about a year ago bought the Petri Concrete Vault Co. Albert Ristau of Joliet, Ill., will be manager of the plant and he is associated with the Grohne brothers of Decatur, Ill., who have a similar plant in that city. Under the new organization it is proposed to manufacture concrete blocks and other concrete products in addition to vaults.

Miscellaneous Rock Products

Philadelphia Quartz Co., Philadelphia, Penn., is to construct a $300,000 plant as a branch of the company at South Gate, Calif. (Los Angeles district).

The Silica Co. of California, incorporation notice of which appeared in our issue of November 8, is now developing silica sand deposits at Mt. Diablo for a silica glass plant near Byron, Calif. C. L. Gorr, F. P. Verdier, O. H. Bertsch, Horace Beverly and Theodore Monell have been named as directors.

Asbestos Talc Products Co. of Washington, Inc., has a mine located just north of Burlington, Wash. The company was organized over a year ago, and has devoted its time to opening up the mine and getting ready to send out a commercial product. A large vein is now opened on the south side of the hill, and about eighty tons has been brought out for processing. The company has also purchased a large warehouse on the tracks at Burlington and installed the necessary machinery and equipment for grinding and separating the various grades of asbestos. C. E. Woollen is president and Claude Buck is secretary-treasurer.

Personals

J. Larson, Jr., has been appointed general traffic manager, H. R. Paul, assistant traffic manager, and A. L. Swanson, credit manager of the Masonite Corp., Chicago, Ill.

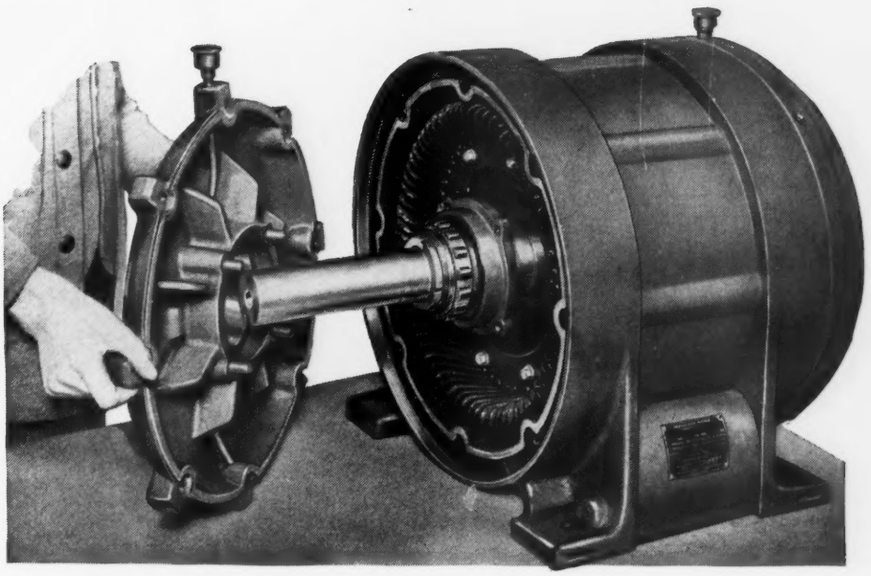
A. W. Beecher, son of A. H. Beecher, former master mechanic at the Northwestern States Portland Cement Co., has returned to Mason City, Ia., to become superintendent of the Mason City Brick and Tile Co.'s plants. He takes the place of W. E. Millington, who resigned.

William Ogden has been appointed manager of the Manufacturers' Division of the Affiliated Bureau, which is established in connection with the general offices of the Associated General Contractors of America in the Munsey Bldg., Washington, D. C.

G. A. New, for several years chemist at the Port Clinton, Ohio, plant of the American Gypsum Co., has resigned from that company and will take up a new line of work in Cleveland. He has won recognition in laboratory gypsum work and has been granted patents on a considerable number of inventions.

H. S. Greene, formerly general sales manager of the Barber-Greene Co., Aurora, Ill., has been

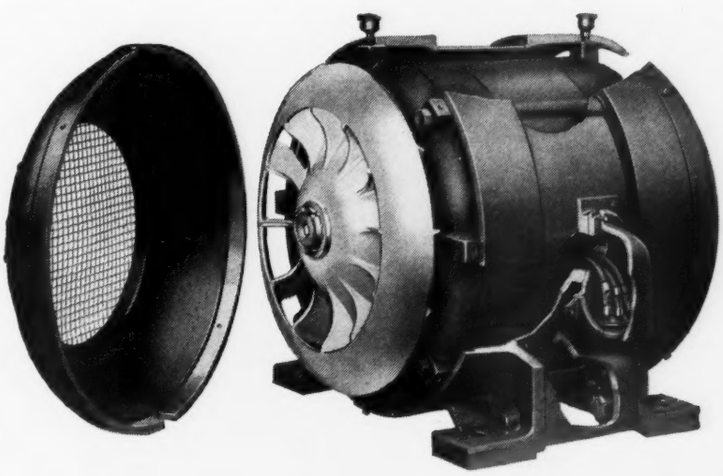
Completely Enclosed without Sacrificing Accessibility



type ARZ fan-cooled motors

Protection to the motor windings with complete accessibility to all parts . . . that was the thought in mind when the Allis-Chalmers type "ARZ" motor was developed. The active parts of this motor are completely enclosed, protecting the stator windings and the rotor — those parts that are subject to injury — from dirt, dust, metallic chips, sulphurous gases, acids, etc.

End closures and bearing supports, including lubricating devices, are combined into single castings with machined fits and make this motor as accessible as the conventional open type. There are no rubbing or revolving seals and no separately attached coil enclosing devices. Cooling air is furnished by a single fan keyed and locked on a short shaft extension opposite the drive end. The mounting space of this enclosed motor is the same as the open type in most ratings.



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ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

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elected to a similar position with the Chain Belt Co., Milwaukee, Wis. Mr. Greene has been with the Chain Belt Co. since 1929 in charge of the coordination of sales and distribution, and previous to that he was with the Barber-Greene Co. for eight years.

Obituaries

Edward Conrad Waldvogel, a director and vice-president of the Yale and Towne Manufacturing Co., Stamford, Conn., passed away after a four-day illness at his home in New Rochelle, N. Y. Mr. Waldvogel entered the service of the Yale and Towne organization in 1905 as a traveling salesman and in 1910 was transferred to New York as assistant to the general manager. He succeeded Walter C. Allen, the present president of the company, as general manager in 1916, and in 1923 was appointed vice-president of the company.

George E. Purple, president of the Flexible Steel Lacing Co., Chicago, Ill., passed away on November 3 at La Grange, Ill. He came to Chicago when still a young man, and in 1907, with Messrs. A. B. Beach and F. S. Rinaldo, he founded the Flexible Steel Lacing Co. His long, energetic business career and active work in charitable and civic undertakings made for him a host of friends who will long remember him for many sterling qualities.

Geo. E. Purple

G. W. Moneymaker, an employe of the Memphis Stone and Gravel Co., Camden, Tenn., died October 27 as the result of an accident when the automobile in which he and Charles Willis, another employe of the firm were driving, overturned.

John Bohm, South Bend, Ind., president of the Concrete Products Co., passed away on November 8 as the result of fatal injuries sustained in an automobile accident at South Milwaukee, Wis.

James S. Greenlee, 62, of the Greenlee Stone and Building Co. of Denver, Colo., died on November 4.

Henry Harnischfeger, aged 75 years, president of the Harnischfeger Corp., Milwaukee, pioneer manufacturer of electric cranes and contractors' machinery, died suddenly in his home in Milwaukee early Saturday morning, November 15. Mr. Harnischfeger came to America as a German immigrant boy shortly after the Franco-Prussian war. He learned the tool maker's trade in the East for ten years and then went to Milwaukee as foreman for a sewing machine company. In 1881, together with Alonzo Pawling, he founded the Pawling and Harnischfeger Co., which grew from a small machine and pattern shop to the present concern doing a business of more than $5,000,000 annually.

Manufacturers

Fuller Lehigh Co., Fullerton, Penn., announces the removal of its Cincinnati office to Carew Tower, Cincinnati, Ohio.

Republic Steel Corp., Cleveland, Ohio, has booked a large order for Enduro "KA2" stainless steel for export to France for the manufacture of automobile lamp shells in that country.

G. H. Williams Co., Erie, Penn., has appointed A. F. Deaney, Indianapolis, Ind., distributor for southern Indiana, and the Stockberger Equipment Co., Fort Wayne, Ind., as distributor for northern Indiana.

New York Belting and Packing Co., New York City, has appointed John A. Wahlgren as general sales manager. Mr. Wahlgren has been associated with the rubber business for the past 12 years and brings to his new position a wide experience in sales activities.

Linde Air Products Co., New York City, advises that the theme of its exhibit in Booths 334-335 at the Ninth Annual Exposition of Power and Mechanical Engineering at the Grand Central Palace, New York City, on December 1 to 6, 1930, will be the strength and dependability of power piping and equipment fabricated by oxy-acetylene welding.

Bacon-Hibbard-Eichman, Inc., Cleveland, Ohio, announces that its corporate name is now Hibbard-Eichman-Smith, Inc., and that the headquarters of the company have been moved from Central Ave. to 999 Front St. N.W. Harvey W. Smith of Canton, Ohio, has joined the organization as vice-president and manager of the Canton branch.

General Electric Co., Schenectady, N. Y., announces that orders received during the third quarter of 1930 amounted to $77,338,074, compared with $116,688,014 for the corresponding period last year. Orders received during the first nine months of 1930 amounted to $267,651,832, compared with $337,404,470 during the corresponding period last year.

American Manganese Steel Co., Chicago Heights, Ill., announces that the Southern Tractor Supply Co., 406 Geer Bldg., Durham, N. C., has been appointed exclusive representative for the sale of Amsco Manganese Steel crawler tractor links and sprockets in the following territory: District of Columbia, North Carolina, South Carolina, eastern Tennessee, Virginia and West Virginia.

Harbison-Walker Refractories Co., Pittsburgh, Penn., has just completed a 5000-ft. motion picture illustrating modern methods employed in the manufacture of refractories. The film shows every step in the production of refractories from the mining of raw materials to the loading and shipping of the finished product. The film is available, without cost, to technical societies, engineering organizations, industrial organizations, universities, colleges, technical schools and research laboratories.

Link-Belt Co., Chicago, Ill., having recently completed a new factory at Toronto, Canada, as well as an entirely new plant to house its Pacific Division at San Francisco, Calif., now announces another improvement for its Indianapolis foundry. The company has recently closed a contract for a powdered coal system entailing an expenditure of $125,000. A building to house the system and alterations in the plant will be included in the improvements.

Hercules Motors Corp., Canton, Ohio, has appointed Hedge and Mattheis Co. and Cyril J. Burke as new distributors for Hercules engines, power units and spare parts. In the New England states the Hedge and Mattheis Co., with headquarters at 285 Dorchester Ave., Boston, Mass., will carry a representative line of engines, power units and parts in Boston and also distribute Hercules products out of its branches in Springfield and Worcester, Mass., as well as out of Portland, Me., and Providence, R. I. Cyril J. Burke will carry a complete stock of service parts for Hercules engines and display several models of Hercules engines and units at his headquarters, 401 Great Lakes Terminal Bldg., Detroit, Mich.

The Power Manufacturing Co., Marion, Ohio, announces that its Victor Sales Organization is now a 100% distributor organization, and in order to render the best possible co-operation from the home office, regional sales districts have been created with a representative of the home office in charge of each district. These representatives are as follows: Northern region, L. R. Johnson, headquarters at Marion, Ohio; southern region, H. G. Stuart, 1716 Faxon Ave., Memphis, Tenn.; southwestern region, Cuvis Carey, 113 Murray St., Dallas, Tex.; western region, B. H. Rice, headquarters at Marion, Ohio; and Pacific region, Arthur F. King Co., 111 Sutter St., San Francisco, Calif.

The Lincoln Electric Co., Cleveland, Ohio, is sponsoring the Second Lincoln Arc Welding Prize Competition, to give designers and engineers in every industry, where iron and steel forms all or a part of the manufactured product, an opportunity to show their skill and ingenuity in utilizing the advantages of arc-welded construction. As a reward for their efforts, $17,500 will be awarded for the 41 best papers submitted in the competition. The jury of awards, who will judge the papers entered in the competition, will be composed of the Electrical Engineering Department of Ohio State University, under chairmanship of Prof. Erwin E. Dreese, head of the department, and such others as he may select. The 41 prizes to be given by the Lincoln Electric Co. to the winners as selected by the jury of awards are: For the first prize paper, $7500; for the second prize paper, $3500; for the third prize paper, $1500; for the fourth prize paper, $750; for the fifth prize paper, $500; for the sixth prize paper, $250, and for the seventh to 41st prize papers, $100 each.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Jaw Crushers. New bulletin describing notable features of Traylor Bulldog jaw crushers and their efficiency as rock-breaking units. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

High-Early-Strength Portland Cement. The dependability and time-saving advantages of "Incor" Perfected High-Early-Strength Portland Cement for highway construction are discussed in a new folder of the INTERNATIONAL CEMENT CORP., New York City.

Crushers. Bulletin **No. 510** describing the new Jeffrey Flextooth Crusher, which the manufacturers state has been designed to meet the increasing demand for a unit that will produce smaller uniform sizes of coal than can be readily produced by the ordinary roll crusher. THE JEFFREY MANUFACTURING CO., Columbus, Ohio.

Gas+Air Excavator. "What About This Gas+Air?" is the title of a booklet, recently issued, discussing the mechanical principles involved in the operation of the Gas+Air excavator, a three-engine gasoline machine which it is claimed offers advantages of independent power for crowd and swing that eliminates bothersome clutches. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Nickel Alloy Steel Forgings. No. 17, Nickel Steel Data and Applications, is a paper by Charles McKnight entitled "Nickel Alloy Steel Forgings" and dealing briefly with the manufacture, uses, analyses, heat treatment and properties of nickel alloy steel forgings larger than 4 in. in diameter or equivalent section. THE INTERNATIONAL NICKEL CO., INC., New York City.

Speed Reducers. Bulletin **No. 230** covering the Falk complete standardized line of parallel shaft herringbone reducers. This is a 68-page booklet describing the line in detail and giving rate tables which make it easy to select the proper unit for any given application. A section of the book is devoted to photographs of installations in various industries, and another section contains illustrations of large special drives. THE FALK CORP., Milwaukee, Wis.

Manganese Steel Feeder. Folder describing a new type of feeder designed primarily to handle abrasive bulk materials in large tonnages. Installation photographs, tables of capacities, dimensions and building clearances are shown, as well as diagrams to show the construction of the patented Amsco manganese steel pans that interlock to form a rigid conveyor surface upon which carloads of stone can be dumped. STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill.

Automatic Control Mechanisms. "The Era of Automatic Control" is the title of a very interesting booklet on industrial progress in modern process control methods. Devices for controlling temperatures as used in various industries are described in detail and excellently illustrated. Manometers for automatically controlling flow and liquid level and automatic signaling pressure gages are also described. THE BROWN INSTRUMENT CO., Philadelphia, Penn.

Shovels. The story of progress of the Marion Steam Shovel Co. from the time of its incorporation in 1884 until the present day is told in the September issue of "The Ground-Hog," which is the very interesting house organ published by this company. The company is celebrating its 46th anniversary, and the issue contains some very comprehensive contributions on shovel practice that will be of interest to all producers. THE MARION STEAM SHOVEL CO., Marion, Ohio.

Silent and Roller Chains. A new 124-page catalog on silent and roller chain, contains not only complete data on these types of chain, but also engineering data of practical value to chain users in figuring chain drives. It also contains complete information and engineering data on sprockets used in conjunction with silent and roller chain drives, and on chain attachments for special purposes. THE UNION CHAIN AND MFG. CO., Sandusky, Ohio.

Air Separator. Bulletin describing the Raymond mechanical air separator which may be installed in conjunction with almost all types of mills, such as hammer, tube, roller, ball, attrition, etc. According to the description, when grinding products such as cement clinker, sand, lime, limestone, phosphate rock, gypsum, silica, feldspar, etc., the mechanical separator assures absolutely uniform output, regardless of the wear of the mill or variation of feed. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Concrete Surfacing Machinery. Bulletins describing the improved Model "A" Berg concrete surfacer and finisher for removing board or form marks and all surface irregularities from concrete construction. Folder describing the Berg Hi-Way Surfacer for surfacing and finishing of highways, concrete roads and asphalt streets—for cutting down high spots, surface irregularities, uneven expansion joints and repaired patches. Folder covering the Berg electric portable pneumatic cleaning tool for removing paint, rust and scale in the industrial and marine fields. THE CONCRETE SURFACING MACHINERY CO., Cincinnati, Ohio.

Alloy Products. The Amsco Bulletin for September describes various products made from Fahralloy, which is claimed to be a remarkable heat and corrosion resistant alloy. Such products as dry shafts and discs, pin bars, slurry feed pipes, and furnace door frames are illustrated and described in the bulletin, which also covers three Amsco manganese steel Type "T" material handling pumps, sprocket wheels, gears and pinions, chute and hopper liners made of Amsco manganese steel, and a large strip mine shovel on which Amsco dipper teeth and bases are used. AMERICAN MANGANESE STEEL CO., Chicago Heights, Ill.

Pneumatic Conveying and Dust Control. Bulletin **No. 522** contains an article on pneumatic conveying and dust control by E. H. de Coningh, reprinted from "Ceramic Industry." THE DUST RECOVERING AND CONVEYING CO., Cleveland, Ohio.